United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Montana Agricultural
Experiment Station

Soil Survey of Musselshell County, Montana

Part I

How to Use This Soil Survey

This survey is divided into three parts. Part I includes general information about the survey area; descriptions of the detailed soil map units and soil series in the area; and a description of how the soils formed. Part II describes the use and management of the soils and the major soil properties. This part may be updated as further information about soil management becomes available. Part III includes the maps.

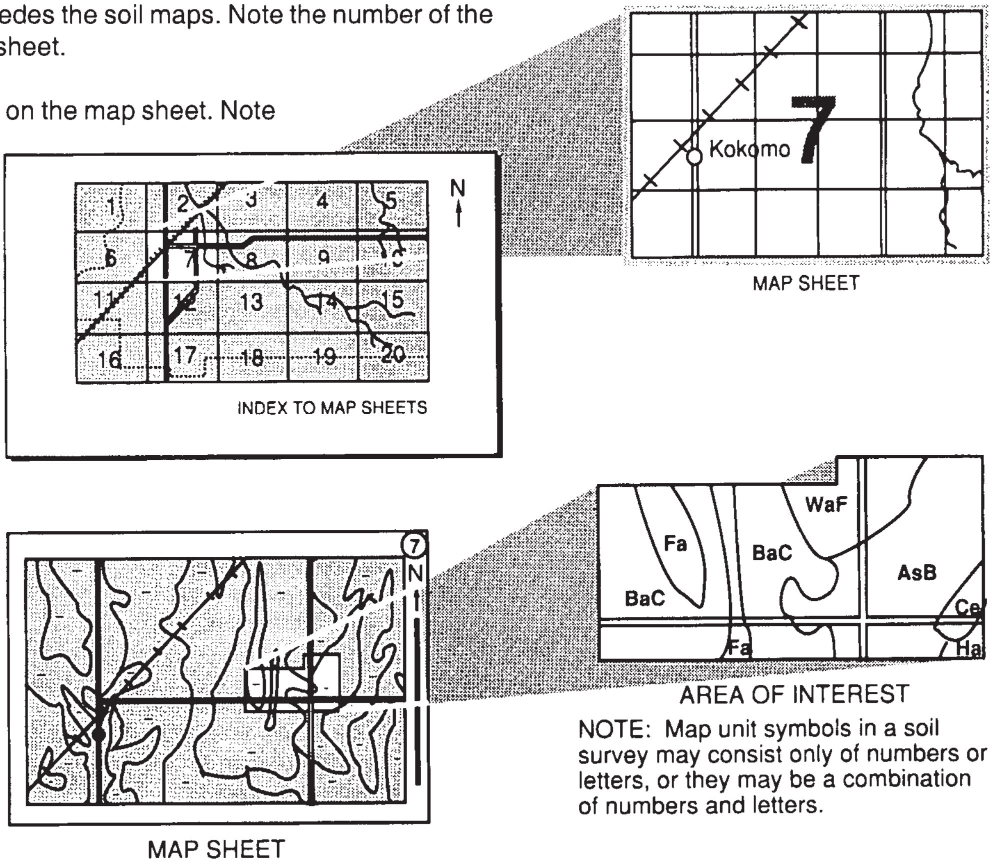
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets,** which precedes the soil maps. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** in Part I of this survey, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

A **State Soil Geographic Data Base** (STATSGO) is available for this survey area. This data base consists of a soils map at a scale of 1:250,000 along with groups of associated soils. It replaces the general soils map published in older surveys. This map and its data base can be useful for planning multi-county areas and map output can be tailored for specific use. For more information about the State Soil Geographic Data Base for this survey area, or for any portion of Montana, contact your local Natural Resources Conservation Service office.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1994. Soil names and descriptions were approved in 1995. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1994. This survey was made cooperatively by the Natural Resources Conservation Service and the Montana Agricultural Experiment Station. It is part of the technical assistance furnished to the Bureau of Land Management and the Lower Musselshell Conservation District. Financial assistance was provided by the Lower Musselshell Conservation District through the Montana Department of Natural Resources and Conservation.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: The soils of Musselshell County are closely related to the landscape on which they occur. The soils in the foreground are Cabbart-Delpoint-Rock outcrop complex, 4-15 percent slopes.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov.

Contents

Part I

Index to Series 11
Numerical Index to Map Units 12
Summary of Tables 17
Foreword 19
Introduction 21
  How This Survey Was Made 21
  General Nature of the Survey Area 22
    History and Development 22
    Industry 23
    Transportation and Recreation 23
    Physiography and Drainage 23
    Geologic History and Regional Geology 24
    Geologic Structure 25
    Geologic Units 25
    Coal, Oil, and Natural Gas Resources 28
    Ground Water Resources 28
    Seismic Activity 28
    Climate 29
Formation and Classification of the Soils 33
  Formation of the Soils 33
  Classification of the Soils 34
Soil Series and Detailed Soil Map Units 41
  Abor Series 42
    60B—Abor silty clay, 1 to 8 percent slopes 43
    74E—Abor-Crago complex, 15 to 35 percent slopes 43
    74D—Abor-Crago complex, 2 to 15 percent slopes 44
    60C—Abor-Neldore silty clays, 2 to 8 percent slopes 44
  Absher Series 45
  Attewan Series 46
    57B—Attewan cobbly loam, 0 to 4 percent slopes 47
    57A—Attewan loam, 0 to 4 percent slopes 48
    57C—Attewan-Niart loams, 0 to 4 percent slopes 48
    1E—Badland 48
  Barvon Series 49
    283D—Barvon-Cabba loams, 2 to 8 percent slopes 49
    289D—Barvon-Cabba-Korchea loams, 3 to 25 percent slopes 50
    255D—Barvon-Cabba-Shambo loams, 4 to 15 percent slopes 51
  Binna Series 51
    92A—Binna loam, 0 to 4 percent slopes 52
  Bitton Series 52
    295F—Bitton-Winifred-Castner complex, 15 to 60 percent slopes 53
  Blacksheep Series 54
    80E—Blacksheep-Rock outcrop-Twilight complex, 8 to 45 percent slopes 55
    243F—Blacksheep-Twilight sandy loams, 8 to 45 percent slopes 55
  Borky Series 56
    296D—Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes 57
  Bullhook Series 57
  Busby Series 58
    30C—Busby fine sandy loam, 2 to 8 percent slopes 59
    30D—Busby fine sandy loam, 8 to 15 percent slopes 59
    130B—Busby-Twilight complex, 2 to 8 percent slopes 60
  Cabba Series 60
    289F—Cabba-Barvon loams, 15 to 65 percent slopes 61
    284D—Cabba-Barvon loams, 4 to 15 percent slopes 61
    285D—Cabba-Doney loams, 4 to 15 percent slopes 62
    285F—Cabba-Doney loams, 8 to 45 percent slopes 63
    283F—Cabba-Rock outcrop complex, 8 to 45 percent slopes 63
  Cabbart Series 64
    85A—Cabbart clay loam, 0 to 2 percent slopes 64

81D—Cabbart loam, 4 to 15 percent slopes 65
280D—Cabbart, moist-Delpoint, dry loams, 4 to 15 percent slopes 65
287F—Cabbart, moist-Delpoint, dry loams, 8 to 45 percent slopes 66
181E—Cabbart-Crago-Delpoint complex, 15 to 35 percent slopes 66
181D—Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes 67
288F—Cabbart-Delpoint loams, 15 to 65 percent slopes 68
82B—Cabbart-Delpoint loams, 4 to 15 percent slopes 68
82C—Cabbart-Delpoint-Rock outcrop complex, 4 to 15 percent slopes 69
82E—Cabbart-Delpoint-Rock outcrop complex, 8 to 45 percent slopes 69
154D—Cabbart-Marmarth complex, 4 to 15 percent slopes 70
86D—Cabbart-Rentsac complex, 2 to 15 percent slopes 71
86E—Cabbart-Rock outcrop complex, 4 to 35 percent slopes 71
286F—Cabbart-Rock outcrop complex, 8 to 45 percent slopes 72
83D—Cabbart-Rock outcrop-Blacksheep complex, 8 to 45 percent slopes 72
153D—Cabbart-Tanna loams, 4 to 15 percent slopes 73
84E—Cabbart-Yawdim-Delpoint complex, 15 to 35 percent slopes 73
84C—Cabbart-Yawdim-Delpoint complex, 4 to 15 percent slopes 74
84D—Cabbart-Yawdim-Rock outcrop complex, 4 to 35 percent slopes 75

Castner Series 75
282D—Castner channery loam, 4 to 25 percent slopes 76
280E—Castner-Kuro complex, 4 to 25 percent slopes 77
281E—Castner-Rock outcrop complex, 8 to 45 percent slopes 77

Chinook Series 78
90B—Chinook fine sandy loam, 2 to 8 percent slopes 78

Crago Series 79
93B—Crago cobbly loam, 1 to 6 percent slopes 80
94A—Crago gravelly loam, 0 to 8 percent slopes 80
94E—Crago gravelly loam, 8 to 35 percent slopes 81
96E—Crago-Abor complex, 4 to 35 percent slopes 81
95C—Crago-Attewan cobbly loams, 2 to 8 percent slopes 82
95B—Crago-Attewan-Musselshell cobbly loams, 0 to 4 percent slopes 82
95A—Crago-Musselshell cobbly loams, 0 to 4 percent slopes 83
93A—Crago-Musselshell complex, 0 to 4 percent slopes 83
56A—Crago-Musselshell-Attewan complex, 0 to 2 percent slopes 84

Creed Series 85
123C—Creed-Gerdrum loams, 0 to 8 percent slopes 86

Dast Series 86
242D—Dast-Ridge sandy loams, 2 to 8 percent slopes 87

Delplain Series 88

Delpoint Series 88
31B—Delpoint loam, 2 to 8 percent slopes 89
39B—Delpoint loam, calcareous, 2 to 8 percent slopes 89
87B—Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes 90
39C—Delpoint, calcareous-Cabbart-Yamacall loams, 4 to 15 percent slopes 90
287D—Delpoint, dry-Cabbart, moist loams, 2 to 8 percent slopes 91
81B—Delpoint-Cabbart loams, 2 to 8 percent slopes 92
81C—Delpoint-Cabbart loams, 8 to 15 percent slopes 92

288D—Delpoint-Cabbart-Havre loams, 4 to 25 percent slopes 93
88D—Delpoint-Cabbart-Rock outcrop complex, 4 to 35 percent slopes 94
31C—Delpoint-Cabbart-Yamacall loams, 4 to 15 percent slopes 94
131C—Delpoint-Yamacall loams, 2 to 8 percent slopes 95
DA—Denied access 95
Doney Series 96
281D—Doney-Cabba-Macar loams, 4 to 15 percent slopes 96
284F—Doney-Wayden complex, 15 to 60 percent slopes 97
Eapa Series 98
52A—Eapa loam, 0 to 2 percent slopes 99
52B—Eapa loam, 2 to 8 percent slopes 99
152A—Eapa-Attewan loams, 0 to 2 percent slopes 99
Ethridge Series 100
51A—Ethridge clay loam, 0 to 2 percent slopes 101
51B—Ethridge clay loam, 2 to 8 percent slopes 101
158A—Ethridge-Verson clay loams, 0 to 2 percent slopes 102
Fergus Series 102
254C—Fergus clay loam, 2 to 8 percent slopes 103
Gerdrum Series 103
23C—Gerdrum-Creed loams, 0 to 8 percent slopes 105
23A—Gerdrum-Vanda complex, 0 to 8 percent slopes 105
23B—Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes 106
Glendive Series 106
Harlake Series 107
5A—Harlake silty clay, 0 to 2 percent slopes 108
6A—Harlake silty clay, 0 to 2 percent slopes, occasionally flooded 108
8B—Harlake-Havre complex, 0 to 2 percent slopes 109
8A—Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded 109
17A—Harlake-Havre complex, calcareous, 0 to 2 percent slopes 110
20B—Harlake-Marvan-Vanda silty clays, 0 to 4 percent slopes 110
Havre Series 111
9A—Havre loam, 0 to 2 percent slopes 112
10A—Havre loam, 0 to 2 percent slopes, occasionally flooded 112
13A—Havre loam, calcareous, 0 to 2 percent slopes 112
14A—Havre, calcareous-Glendive complex, 0 to 2 percent slopes 113
14B—Havre, calcareous-Glendive complex, 0 to 2 percent slopes, occasionally flooded 113
11A—Havre-Glendive complex, 0 to 2 percent slopes 114
11B—Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded 114
15A—Havre-Harlake complex, calcareous, 0 to 2 percent slopes 115
12A—Havre-Harlake complex, channeled, 0 to 2 percent slopes 115
9B—Havre-Yamacall loams, 0 to 4 percent slopes 116
16A—Havre-Yamacall loams, calcareous, 0 to 4 percent slopes 116
Hilger Series 117
252E—Hilger stony loam, 4 to 25 percent slopes 118
252D—Hilger-Rock outcrop complex, 4 to 35 percent slopes 118
Hinterland Series 118
50B—Hinterland loam, 1 to 6 percent slopes 119
50C—Hinterland loam, 6 to 15 percent slopes 120

50D—Hinterland-Delplain complex, 8 to 25 percent slopes 120
Hughesville Series 120
232E—Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes 122
Kobase Series 122
40B—Kobase silty clay loam, 0 to 8 percent slopes 124
40C—Kobase silty clay loam, calcareous, 0 to 8 percent slopes 124
140B—Kobase-Megonot silty clay loams, 0 to 8 percent slopes 124
140C—Kobase-Megonot silty clay loams, calcareous, 0 to 8 percent slopes 125
38A—Kobase-Zatoville silty clay loams, 0 to 8 percent slopes 125
Korchea Series 126
Kremlin Series 127
91A—Kremlin loam, 0 to 2 percent slopes 128
91B—Kremlin loam, 2 to 8 percent slopes 128
Kuro Series 128
260F—Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes 129
Lamedeer Series 130
245C—Lamedeer-Ringling channery loams, 2 to 8 percent slopes 131
245F—Lamedeer-Ringling channery loams, 4 to 45 percent slopes 131
246F—Lamedeer-Ringling channery loams, moist, 4 to 45 percent slopes 132
Lostriver Series 132
7A—Lostriver silty clay, 0 to 2 percent slopes 133
7B—Lostriver-Bullhook complex, 0 to 2 percent slopes 133
Macar Series 134
230C—Macar loam, 2 to 8 percent slopes 135
Macmeal Series 135
250E—Macmeal-Rock outcrop complex, 4 to 35 percent slopes 136
Marias Series 137
63A—Marias silty clay, 0 to 4 percent slopes 138
Marmarth Series 138
54A—Marmarth fine sandy loam, 0 to 8 percent slopes 139
154C—Marmarth-Cabbart loams, 2 to 8 percent slopes 139
Marvan Series 140
64B—Marvan silty clay, 0 to 8 percent slopes 141
64A—Marvan-Vanda silty clays, 0 to 8 percent slopes 141
McKenzie Series 142
21A—McKenzie silty clay, 0 to 2 percent slopes 142
Megonot Series 143
68C—Megonot-Yawdim silty clay loams, 4 to 15 percent slopes 144
Musselshell Series 144
97A—Musselshell-Crago cobbly loams, 0 to 4 percent slopes 145
97B—Musselshell-Crago complex, 4 to 8 percent slopes 146
Neldore Series 146
62C—Neldore silty clay, 4 to 25 percent slopes 147
60E—Neldore-Abor silty clays, 15 to 45 percent slopes 147
60D—Neldore-Abor silty clays, 4 to 15 percent slopes 148
61D—Neldore-Neldore, saline silty clays, 4 to 25 percent slopes 148
62E—Neldore-Rock outcrop complex, 15 to 45 percent slopes 149
61E—Neldore-Volborg silty clays, 4 to 25 percent slopes 149
62D—Neldore-Yawdim silty clays, 4 to 25 percent slopes 150
Niart Series 150
98A—Niart cobbly loam, 0 to 4 percent slopes 151
98B—Niart-Crago complex, 0 to 4 percent slopes 152
98C—Niart-Crago complex, 4 to 15 percent slopes 152

98D—Niart-Rothiemay loams, 0 to 4 percent slopes 153
Nobe Series 153
22B—Nobe-Absher complex, 0 to 4 percent slopes 154
Orinoco Series 155
69C—Orinoco-Yawdim silty clay loams, 4 to 15 percent slopes 156
Rentsac Series 156
89C—Rentsac fine sandy loam, 2 to 8 percent slopes 157
189C—Rentsac-Cabbart complex, 2 to 15 percent slopes 157
189E—Rentsac-Rock outcrop complex, 15 to 45 percent slopes 158
Ridge Series 158
242F—Ridge-Dast sandy loams, 8 to 45 percent slopes 159
240E—Ridge-Dast-Rock outcrop complex, 4 to 35 percent slopes 160
Ringling Series 160
3A—Riverwash 161
2E—Rock outcrop 162
Rothiemay Series 162
142A—Rothiemay loam, calcareous, 0 to 2 percent slopes 163
142B—Rothiemay loam, calcareous, 2 to 8 percent slopes 163
142C—Rothiemay-Crago complex, 4 to 15 percent slopes 163
Savage Series 164
251C—Savage loam, 2 to 8 percent slopes 165
Shambo Series 165
294C—Shambo loam, 2 to 8 percent slopes 166
255C—Shambo-Korchea-Barvon loams, 2 to 8 percent slopes 166
Sinnigam Series 167
Straw Series 168
292A—Straw-Korchea loams, 0 to 2 percent slopes 169
Tanna Series 169
53A—Tanna loam, 1 to 6 percent slopes 170
153C—Tanna-Cabbart loams, 2 to 8 percent slopes 171
Tibs Series 171
234F—Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes 172
Twilight Series 173
32B—Twilight sandy loam, 2 to 8 percent slopes 174
132B—Twilight-Blacksheep sandy loams, 2 to 8 percent slopes 174
32D—Twilight-Blacksheep-Rock outcrop complex, 4 to 25 percent slopes 175
241E—Twilight-Blacksheep-Rock outcrop complex, 4 to 35 percent slopes 175
UL—Urban land 176
Vanda Series 176
25A—Vanda silty clay, 0 to 4 percent slopes 177
Verson Series 177
58A—Verson clay loam, 0 to 4 percent slopes 178
Volborg Series 179
Warhorse Series 179
W—Water 180
Wayden Series 180
261F—Wayden-Castner complex, 8 to 45 percent slopes 181
262E—Wayden-Windham complex, 4 to 25 percent slopes 181
Weingart Series 182
26A—Weingart loam, 1 to 8 percent slopes 183
26B—Weingart-Warhorse loams, 1 to 8 percent slopes 183
Whitecow Series 184
Windham Series 185
291C—Windham very stony loam, 2 to 15 percent slopes 186
Winifred Series 186
Yamacall Series 187
34A—Yamacall clay loam, 0 to 2 percent slopes 188

34B—Yamacall clay loam, 2 to 8 percent slopes ... 189
37A—Yamacall clay loam, calcareous, 0 to 2 percent slopes ... 189
37B—Yamacall clay loam, calcareous, 2 to 8 percent slopes ... 189
33A—Yamacall loam, 0 to 2 percent slopes ... 190
33B—Yamacall loam, 2 to 8 percent slopes ... 190
41A—Yamacall loam, calcareous, 0 to 2 percent slopes ... 190
41B—Yamacall loam, calcareous, 2 to 8 percent slopes ... 191
35B—Yamacall-Busby complex, 2 to 8 percent slopes ... 191
36B—Yamacall-Delpoint loams, 2 to 8 percent slopes ... 192
41C—Yamacall-Delpoint loams, calcareous, 2 to 8 percent slopes ... 192
256C—Yamacall-Havre-Delpoint loams, 2 to 8 percent slopes ... 193
Yawdim Series ... 193
67D—Yawdim silty clay loam, 4 to 25 percent slopes ... 194
73E—Yawdim-Abor complex, 15 to 60 percent slopes ... 194
73D—Yawdim-Abor complex, 4 to 15 percent slopes ... 195
95E—Yawdim-Crago complex, 4 to 35 percent slopes ... 195
167E—Yawdim-Orinoco silty clay loams, 15 to 35 percent slopes ... 196
167D—Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes ... 196
Zatoville Series ... 197
38B—Zatoville silty clay loam, 0 to 8 percent slopes ... 198
138B—Zatoville-Orinoco silty clay loams, 2 to 8 percent slopes ... 198
References ... 201
Glossary ... 203

Part II

Detailed Soil Map Unit Legend
Summary of Tables
Introduction
Agronomy
  Cropland Limitations and Hazards
  Crop Yield Estimates
  Pasture and Hayland Interpretations
  Land Capability Classification
  Prime Farmland and Other Important Farmland
  Erosion Factors
  Windbreaks and Environmental Plantings
Range
  General Range Sites in Musselshell County
  Range Condition
  Rangeland Management
  Woodland Understory Vegetation
Forest Land
  Woodland Ordination System
  Forest Land Management and Productivity
  Forest Access Road Limitations and Hazards
Recreation
Wildlife Habitat
  Elements of Wildlife Habitat
  Kinds of Wildlife Habitat
  Wildlife in Musselshell County
Engineering
  Building Site Development
  Sanitary Facilities
  Waste Management
  Construction Materials
  Water Management
Soil Properties
  Engineering Index Properties
  Physical and Chemical Properties
  Water Features
  Soil Features
References
Glossary

Issued 2004

Index to Series

Abor Series 42
Absher Series 45
Attewan Series 46
Barvon Series 49
Binna Series 51
Bitton Series 52
Blacksheep Series 54
Borky Series 56
Bullhook Series 57
Busby Series 58
Cabba Series 60
Cabbart Series 64
Castner Series 75
Chinook Series 78
Crago Series 79
Creed Series 85
Dast Series 86
Delplain Series 88
Delpoint Series 88
Doney Series 96
Eapa Series 98
Ethridge Series 100
Fergus Series 102
Gerdrum Series 103
Glendive Series 106
Harlake Series 107
Havre Series 111
Hilger Series 117
Hinterland Series 118
Hughesville Series 120
Kobase Series 122
Korchea Series 126
Kremlin Series 127
Kuro Series 128
Lamedeer Series 130
Lostriver Series 132
Macar Series 134
Macmeal Series 135
Marias Series 137
Marmarth Series 138
Marvan Series 140
McKenzie Series 142
Megonot Series 143
Musselshell Series 144
Neldore Series 146
Niart Series 150
Nobe Series 153
Orinoco Series 155
Rentsac Series 156
Ridge Series 158
Ringling Series 160
Rothiemay Series 162
Savage Series 164
Shambo Series 165
Sinnigam Series 167
Straw Series 168
Tanna Series 169
Tibs Series 171
Twilight Series 173
Vanda Series 176
Verson Series 177
Volborg Series 179
Warhorse Series 179
Wayden Series 180
Weingart Series 182
Whitecow Series 184
Windham Series 185
Winifred Series 186
Yamacall Series 187
Yawdim Series 193
Zatoville Series 197

Numerical Index to Map Units

1E—Badland 48
2E—Rock outcrop 162
3A—Riverwash 161
5A—Harlake silty clay, 0 to 2 percent slopes 108
6A—Harlake silty clay, 0 to 2 percent slopes, occasionally flooded 108
7A—Lostriver silty clay, 0 to 2 percent slopes 133
7B—Lostriver-Bullhook complex, 0 to 2 percent slopes 133
8A—Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded 109
8B—Harlake-Havre complex, 0 to 2 percent slopes 109
9A—Havre loam, 0 to 2 percent slopes 112
9B—Havre-Yamacall loams, 0 to 4 percent slopes 116
10A—Havre loam, 0 to 2 percent slopes, occasionally flooded 112
11A—Havre-Glendive complex, 0 to 2 percent slopes 114
11B—Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded 114
12A—Havre-Harlake complex, channeled, 0 to 2 percent slopes 115
13A—Havre loam, calcareous, 0 to 2 percent slopes 112
14A—Havre, calcareous-Glendive complex, 0 to 2 percent slopes 113
14B—Havre, calcareous-Glendive complex, 0 to 2 percent slopes, occasionally flooded 113
15A—Havre-Harlake complex, calcareous, 0 to 2 percent slopes 115
16A—Havre-Yamacall loams, calcareous, 0 to 4 percent slopes 116
17A—Harlake-Havre complex, calcareous, 0 to 2 percent slopes 110
20B—Harlake-Marvan-Vanda silty clays, 0 to 4 percent slopes 110
21A—McKenzie silty clay, 0 to 2 percent slopes 142
22B—Nobe-Absher complex, 0 to 4 percent slopes 154
23A—Gerdrum-Vanda complex, 0 to 8 percent slopes 105
23B—Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes 106
23C—Gerdrum-Creed loams, 0 to 8 percent slopes 105
25A—Vanda silty clay, 0 to 4 percent slopes 177
26A—Weingart loam, 1 to 8 percent slopes 183
26B—Weingart-Warhorse loams, 1 to 8 percent slopes 183
30C—Busby fine sandy loam, 2 to 8 percent slopes 59
30D—Busby fine sandy loam, 8 to 15 percent slopes 59
31B—Delpoint loam, 2 to 8 percent slopes 89
31C—Delpoint-Cabbart-Yamacall loams, 4 to 15 percent slopes 94
32B—Twilight sandy loam, 2 to 8 percent slopes 174
32D—Twilight-Blacksheep-Rock outcrop complex, 4 to 25 percent slopes 175
33A—Yamacall loam, 0 to 2 percent slopes 190
33B—Yamacall loam, 2 to 8 percent slopes 190
34A—Yamacall clay loam, 0 to 2 percent slopes 188
34B—Yamacall clay loam, 2 to 8 percent slopes 189
35B—Yamacall-Busby complex, 2 to 8 percent slopes 191
36B—Yamacall-Delpoint loams, 2 to 8 percent slopes 192
37A—Yamacall clay loam, calcareous, 0 to 2 percent slopes 189
37B—Yamacall clay loam, calcareous, 2 to 8 percent slopes 189
38A—Kobase-Zatoville silty clay loams, 0 to 8 percent slopes 125

38B—Zatoville silty clay loam, 0 to 8 percent slopes 198
39B—Delpoint loam, calcareous, 2 to 8 percent slopes 89
39C—Delpoint, calcareous-Cabbart-Yamacall loams, 4 to 15 percent slopes 90
40B—Kobase silty clay loam, 0 to 8 percent slopes 124
40C—Kobase silty clay loam, calcareous, 0 to 8 percent slopes 124
41A—Yamacall loam, calcareous, 0 to 2 percent slopes 190
41B—Yamacall loam, calcareous, 2 to 8 percent slopes 191
41C—Yamacall-Delpoint loams, calcareous, 2 to 8 percent slopes 192
50B—Hinterland loam, 1 to 6 percent slopes 119
50C—Hinterland loam, 6 to 15 percent slopes 120
50D—Hinterland-Delplain complex, 8 to 25 percent slopes 120
51A—Ethridge clay loam, 0 to 2 percent slopes 101
51B—Ethridge clay loam, 2 to 8 percent slopes 101
52A—Eapa loam, 0 to 2 percent slopes 99
52B—Eapa loam, 2 to 8 percent slopes 99
53A—Tanna loam, 1 to 6 percent slopes 170
54A—Marmarth fine sandy loam, 0 to 8 percent slopes 139
56A—Crago-Musselshell-Attewan complex, 0 to 2 percent slopes 84
57A—Attewan loam, 0 to 4 percent slopes 48
57B—Attewan cobbly loam, 0 to 4 percent slopes 47
57C—Attewan-Niart loams, 0 to 4 percent slopes 48
58A—Verson clay loam, 0 to 4 percent slopes 178
60B—Abor silty clay, 1 to 8 percent slopes 43
60C—Abor-Neldore silty clays, 2 to 8 percent slopes 44
60D—Neldore-Abor silty clays, 4 to 15 percent slopes 148
60E—Neldore-Abor silty clays, 15 to 45 percent slopes 147
61D—Neldore-Neldore, saline silty clays, 4 to 25 percent slopes 148
61E—Neldore-Volborg silty clays, 4 to 25 percent slopes 149
62C—Neldore silty clay, 4 to 25 percent slopes 147
62D—Neldore-Yawdim silty clays, 4 to 25 percent slopes 150
62E—Neldore-Rock outcrop complex, 15 to 45 percent slopes 149
63A—Marias silty clay, 0 to 4 percent slopes ... 138
64A—Marvan-Vanda silty clays, 0 to 8 percent slopes 141
64B—Marvan silty clay, 0 to 8 percent slopes 141
67D—Yawdim silty clay loam, 4 to 25 percent slopes 194
68C—Megonot-Yawdim silty clay loams, 4 to 15 percent slopes 144
69C—Orinoco-Yawdim silty clay loams, 4 to 15 percent slopes 156
73D—Yawdim-Abor complex, 4 to 15 percent slopes 195
73E—Yawdim-Abor complex, 15 to 60 percent slopes 194
74D—Abor-Crago complex, 2 to 15 percent slopes 44
74E—Abor-Crago complex, 15 to 35 percent slopes 43
80E—Blacksheep-Rock outcrop-Twilight complex, 8 to 45 percent slopes 55
81B—Delpoint-Cabbart loams, 2 to 8 percent slopes 92
81C—Delpoint-Cabbart loams, 8 to 15 percent slopes 92

81D—Cabbart loam, 4 to 15 percent slopes 65
82B—Cabbart-Delpoint loams, 4 to 15 percent slopes 68
82C—Cabbart-Delpoint-Rock outcrop complex, 4 to 15 percent slopes 69
82E—Cabbart-Delpoint-Rock outcrop complex, 8 to 45 percent slopes 69
83D—Cabbart-Rock outcrop-Blacksheep complex, 8 to 45 percent slopes 72
84C—Cabbart-Yawdim-Delpoint complex, 4 to 15 percent slopes 74
84D—Cabbart-Yawdim-Rock outcrop complex, 4 to 35 percent slopes 75
84E—Cabbart-Yawdim-Delpoint complex, 15 to 35 percent slopes 73
85A—Cabbart clay loam, 0 to 2 percent slopes 64
86D—Cabbart-Rentsac complex, 2 to 15 percent slopes 71
86E—Cabbart-Rock outcrop complex, 4 to 35 percent slopes 71
87B—Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes 90
88D—Delpoint-Cabbart-Rock outcrop complex, 4 to 35 percent slopes 94
89C—Rentsac fine sandy loam, 2 to 8 percent slopes 157
90B—Chinook fine sandy loam, 2 to 8 percent slopes 78
91A—Kremlin loam, 0 to 2 percent slopes 128
91B—Kremlin loam, 2 to 8 percent slopes 128
92A—Binna loam, 0 to 4 percent slopes 52
93A—Crago-Musselshell complex, 0 to 4 percent slopes 83
93B—Crago cobbly loam, 1 to 6 percent slopes 80
94A—Crago gravelly loam, 0 to 8 percent slopes 80
94E—Crago gravelly loam, 8 to 35 percent slopes 81
95A—Crago-Musselshell cobbly loams, 0 to 4 percent slopes 83
95B—Crago-Attewan-Musselshell cobbly loams, 0 to 4 percent slopes 82
95C—Crago-Attewan cobbly loams, 2 to 8 percent slopes 82
95E—Yawdim-Crago complex, 4 to 35 percent slopes 195
96E—Crago-Abor complex, 4 to 35 percent slopes 81
97A—Musselshell-Crago cobbly loams, 0 to 4 percent slopes 145
97B—Musselshell-Crago complex, 4 to 8 percent slopes 146
98A—Niart cobbly loam, 0 to 4 percent slopes 151
98B—Niart-Crago complex, 0 to 4 percent slopes 152
98C—Niart-Crago complex, 4 to 15 percent slopes 152
98D—Niart-Rothiemay loams, 0 to 4 percent slopes 153
123C—Creed-Gerdrum loams, 0 to 8 percent slopes 86
130B—Busby-Twilight complex, 2 to 8 percent slopes 60
131C—Delpoint-Yamacall loams, 2 to 8 percent slopes 95
132B—Twilight-Blacksheep sandy loams, 2 to 8 percent slopes 174
138B—Zatoville-Orinoco silty clay loams, 2 to 8 percent slopes 198
140B—Kobase-Megonot silty clay loams, 0 to 8 percent slopes 124
140C—Kobase-Megonot silty clay loams, calcareous, 0 to 8 percent slopes 125
142A—Rothiemay loam, calcareous, 0 to 2 percent slopes 163
142B—Rothiemay loam, calcareous, 2 to 8 percent slopes 163
142C—Rothiemay-Crago complex, 4 to 15 percent slopes 163
152A—Eapa-Attewan loams, 0 to 2 percent slopes 99

153C—Tanna-Cabbart loams, 2 to 8 percent slopes 171
153D—Cabbart-Tanna loams, 4 to 15 percent slopes 73
154C—Marmarth-Cabbart loams, 2 to 8 percent slopes 139
154D—Cabbart-Marmarth complex, 4 to 15 percent slopes 70
158A—Ethridge-Verson clay loams, 0 to 2 percent slopes 102
167D—Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes 196
167E—Yawdim-Orinoco silty clay loams, 15 to 35 percent slopes 196
181D—Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes 67
181E—Cabbart-Crago-Delpoint complex, 15 to 35 percent slopes 66
189C—Rentsac-Cabbart complex, 2 to 15 percent slopes 157
189E—Rentsac-Rock outcrop complex, 15 to 45 percent slopes 158
230C—Macar loam, 2 to 8 percent slopes 135
232E—Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes 122
234F—Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes 172
240E—Ridge-Dast-Rock outcrop complex, 4 to 35 percent slopes 160
241E—Twilight-Blacksheep-Rock outcrop complex, 4 to 35 percent slopes 175
242D—Dast-Ridge sandy loams, 2 to 8 percent slopes 87
242F—Ridge-Dast sandy loams, 8 to 45 percent slopes 159
243F—Blacksheep-Twilight sandy loams, 8 to 45 percent slopes 55
245C—Lamedeer-Ringling channery loams, 2 to 8 percent slopes 131
245F—Lamedeer-Ringling channery loams, 4 to 45 percent slopes 131
246F—Lamedeer-Ringling channery loams, moist, 4 to 45 percent slopes 132
250E—Macmeal-Rock outcrop complex, 4 to 35 percent slopes 136
251C—Savage loam, 2 to 8 percent slopes 165
252D—Hilger-Rock outcrop complex, 4 to 35 percent slopes 118
252E—Hilger stony loam, 4 to 25 percent slopes 118
254C—Fergus clay loam, 2 to 8 percent slopes 103
255C—Shambo-Korchea-Barvon loams, 2 to 8 percent slopes 166
255D—Barvon-Cabba-Shambo loams, 4 to 15 percent slopes 51
256C—Yamacall-Havre-Delpoint loams, 2 to 8 percent slopes 193
260F—Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes 129
261F—Wayden-Castner complex, 8 to 45 percent slopes 181
262E—Wayden-Windham complex, 4 to 25 percent slopes 181
280D—Cabbart, moist-Delpoint, dry loams, 4 to 15 percent slopes 65
280E—Castner-Kuro complex, 4 to 25 percent slopes 77
281D—Doney-Cabba-Macar loams, 4 to 15 percent slopes 96
281E—Castner-Rock outcrop complex, 8 to 45 percent slopes 77
282D—Castner channery loam, 4 to 25 percent slopes 76
283D—Barvon-Cabba loams, 2 to 8 percent slopes 49
283F—Cabba-Rock outcrop complex, 8 to 45 percent slopes 63
284D—Cabba-Barvon loams, 4 to 15 percent slopes 61
284F—Doney-Wayden complex, 15 to 60 percent slopes 97

285D—Cabba-Doney loams, 4 to 15 percent slopes ... 62
285F—Cabba-Doney loams, 8 to 45 percent slopes ... 63
286F—Cabbart-Rock outcrop complex, 8 to 45 percent slopes ... 72
287D—Delpoint, dry-Cabbart, moist loams, 2 to 8 percent slopes ... 91
287F—Cabbart, moist-Delpoint, dry loams, 8 to 45 percent slopes ... 66
288D—Delpoint-Cabbart-Havre loams, 4 to 25 percent slopes ... 93
288F—Cabbart-Delpoint loams, 15 to 65 percent slopes ... 68
289D—Barvon-Cabba-Korchea loams, 3 to 25 percent slopes ... 50
289F—Cabba-Barvon loams, 15 to 65 percent slopes ... 61
291C—Windham very stony loam, 2 to 15 percent slopes ... 186
292A—Straw-Korchea loams, 0 to 2 percent slopes ... 169
294C—Shambo loam, 2 to 8 percent slopes ... 166
295F—Bitton-Winifred-Castner complex, 15 to 60 percent slopes ... 53
296D—Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes ... 57
DA—Denied access ... 95
UL—Urban land ... 176
W—Water ... 180

Summary of Tables

Part I

Temperature and Precipitation 30
Freeze Dates in Spring and Fall 31
Growing Season 32
Classification of the Soils 35
Acreage and Proportionate Extent of the Soils 37

Part II (For page numbers, see "Summary of Tables" in Part II)

Classification of the Soils

Acreage and Proportionate Extent of the Soils

Main Cropland Limitations and Hazards

Land Capability and Yields Per Acre of Crops

Prime Farmland

Windbreak Suitability Group Species

Windbreak Suitability Groups

Range Site Names

Range Site Species List

Woodland Understory Vegetation and Habitat Type

Forest Land Management

Forest Land Productivity

Main Forest Access Road Limitations and Hazards

Recreational Development

Building Site Development

Sanitary Facilities

Construction Materials

Water Management

Engineering Index Properties

Physical Properties of the Soils

Chemical Properties of the Soils

Water Features

Soil Features

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of federal, state, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil that has a component included in a map unit name in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local Natural Resources Conservation Service or Cooperative Extension Service offices.

Dave White
State Conservationist
Natural Resources Conservation Service

Soil Survey of Musselshell County, Montana

Fieldwork by Jane C. Karinen, Howard B. Main, David H. Omen, David A. Vyain, and
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United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Montana Agricultural Experiment Station

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, soil scientists develop a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientists to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge into one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area may not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Nature of the Survey Area

This soil survey updates, in part, the survey of "Central Montana, Reconnaissance" published in 1953. It provides additional information and has maps that show the soils in greater detail.

Musselshell County is located in the south-central part of Montana (fig. 1) within the Rolling High Plains. The county has a land area of 1,197,200 acres, or 1,870 square miles. Fergus and Petroleum Counties border the county to the north, Rosebud County to the east, Yellowstone County to the south, and Golden Valley County to the west. Roundup, the county seat, is in the central part of the county, located along the Musselshell River.

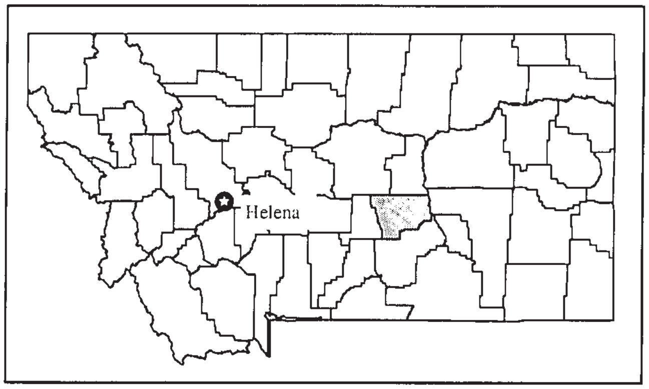

Figure 1. Location of Musselshell County in Montana.

Ranching, dryland farming, and coal and oil production are the current major occupations and industries in the survey area. About 65 percent of the county is used for range. Beef cattle and sheep are the main enterprises. About 5 percent of the county is used for dryland crops. The principal dryland crops are winter wheat, spring wheat, barley, alfalfa hay, grass-legume hay, and pasture. About 1 percent of the county is used for irrigated crops. Alfalfa hay and grass-legume hay are the main irrigated crops. About 20 percent of the county is used for woodland and understory grazing. Ponderosa pine is the dominant tree species.

Elevation in the survey area ranges from 2,710 to 4,905 feet. The mean annual precipitation ranges from 10 to 19 inches, and the mean annual temperature is 47 degrees F. The frost-free period ranges from 90 to 135 days.

History and Development

Musselshell County was established March 1, 1911 and was named after the Musselshell River that flows through it. The county's largest town and county seat is Roundup, which derived its name from its proximity to a historic staging ground for cattle roundups. Other towns of significant population are Melstone and Musselshell, both of which are located along the Musselshell River.

In the early 1900s, numerous other small towns were located throughout the county but have long since faded with the end of the homestead era.

Commercial coal mining dates back to shortly after the turn of the century when the Republic Coal Company purchased land near the town of Roundup to supply the expanding railroad. Soon after, many other smaller, yet significant, coal companies began business.

Musselshell County was also the scene of early oil field production in Montana. In 1919, the first well that produced oil was completed in Devils Basin, an area north of Roundup.

Industry

Ranching, farming, and oil field production are the principal enduring industries in Musselshell County. Coal mining was, at one time, a substantial employer but has faded with the railroads. There is, however, potential for coal to be a significant player in area economics in the future. Local timber harvests are driven by the economics of the wood products industry, with the potential for marketable ponderosa pine existing mainly in the Bull Mountain region of the county.

Ranches, which are predominantly cow/calf operations, rely on livestock for nearly 85 percent of their income. Ranchers market livestock at public stockyards in Billings or deal directly with other local or regional buyers.

In dryland farming, winter wheat is the primary crop. Other main dryland crops grown are spring wheat, barley, alfalfa hay, and grass hay. Some alfalfa hay, grass hay, and grass-legume hay crops are irrigated, primarily along the Musselshell River.

Many productive oil fields currently operate in the northern part of the county.

Transportation and Recreation

Several county and state highways serve the Musselshell County area. U.S. Highway 12 runs east and west through the center of the county connecting the towns of Roundup, Musselshell, and Melstone. U.S. Highway 87 runs north and south through the center of the county, and through northern Yellowstone County, connecting Roundup with Billings and Interstate 94. Numerous secondary roads exist throughout the county; however, in areas where all-season surfaced roads do not exist, travel can be impeded by the weather.

Outdoor recreation opportunities are plentiful in Musselshell County. Elk, white-tailed deer, mule deer, antelope, turkey, various upland game birds, and waterfowl are prevalent. Fishing is good along accessible parts of the Musselshell River and other smaller creeks and ponds throughout the county.

Physiography and Drainage

Musselshell County lies within the unglaciated Missouri Plateau section of the Northern Great Plains Province. The Musselshell River flows to the northeast through the center of the county, turning to the north at the eastern edge where it forms the northern section of the border between Musselshell and Rosebud Counties.

The entire county is included in this soil survey, including the Lake Mason National Wildlife Refuge, managed by the United States Fish and Wildlife Service.

The county contains portions of two mountain ranges. A small portion of the Little Snowy Mountains extends from Fergus County into the northwestern corner of Musselshell County. South of the Musselshell River, the Bull Mountains occupy the southern portion of the county, forming the divide between the Yellowstone and Missouri Rivers.

The county can be divided into three physiographic units. The northwestern corner of the county is mountainous. Plains, made up of shale lowlands separated by sandstone ridges, characterize the remaining area north of the Musselshell River. The plains contain several large, undrained basins including Devils and Lake Mason Basins. A small area of badlands occurs north of Melstone, where bare, steep slopes were eroded into soft shale. South of the Musselshell River, the Bull Mountains are characterized by gently sloping, linear ridgetops with rugged, deeply incised sideslopes.

Elevations range from 2,710 feet above sea level where the Musselshell River flows out of the county to a high of approximately 4,900 feet in the Little Snowy Mountains. Typical elevations in the Bull Mountains range from 3,800 to 4,700 feet. Roundup has an elevation of approximately 3,200 feet.

The Musselshell River drains almost all of the county. The Yellowstone River drains a small area in the southeastern corner of the county, southeast of Burnt Shed Coulee and Carpenter Creek.

The Musselshell River valley is nearly level and wide, ranging from less than half a mile to almost four miles in width. Most of its tributary streams are antecedent; that is, they follow courses preserved from a previous geologic period without regard to the existing geologic structure or topography.

Most of the tributaries of the Musselshell River in this area are intermittent streams. The major tributaries draining the Little Snowy Mountains include Currant, Cameron, Pole, Willow, and North Willow Creeks. Major tributaries draining the Bull Mountains include Dewey, Goulding, Halfbreed, Parrot, Fattig, Hawk, Carpenter, and Horsethief Creeks.

Geologic History and Regional Geology

The geologic history of Musselshell County began approximately 360 million years ago (mya) in the Mississippian Period of the mid-Paleozoic Era.

During most of Paleozoic time, most of Montana was slightly below sea level, covered by warm, shallow seas. Thick sequences of sediments were deposited on coastal plains and the shallow sea floor during alternating periods of emergence and submergence. Sandstone was deposited on beach and near-shore environments; shale was deposited in lower energy, deep-water environments; and limestone was normally formed in warm, shallow-water environments. The rock types grade both laterally and vertically into each other, and their thicknesses are not consistent across large areas. Dark organic matter contained within the sediments was converted into oil and gas and constitutes most of Montana's reserves.

By the beginning of the Pennsylvanian Period, 320-266 mya, much of Montana was above sea level, with the exception of the Big Snowy Trough. It extended through Central Montana from the Rocky Mountain Front to the Williston Basin. Sandstone, shale, and limestone were deposited in this basin during the late-Mississippian to early-Pennsylvanian Periods. Throughout the remainder of the Paleozoic Era, sandstone and shale were deposited on shore and near-shore environments. This era lasted from 570 to 245 mya, ending with an orogeny, or mountain-building episode.

The sea level rose again at the beginning of the Mesozoic Era, 245 to 67 mya. This era was the time of the dinosaur. Fluctuating sea levels continued throughout the Mesozoic Era, depositing thick sedimentary sequences, consisting predominantly of shale and sandstone. Sediments deposited during the Triassic (245-208 mya) and Jurassic (208-144 mya) Periods of the early- to mid-Mesozoic Era consist of a mixture of river, lake, delta, and coastal plain sediments. The land was nearly flat. The fluctuating shoreline shifted back and forth across the region, creating a complex interfingering pattern of sand and mud. Limestone deposition was not as common as it was during the Paleozoic Era. Mesozoic Era sediments also contain oil and gas.

The marine migrations continued without interruption until the late Cretaceous Period, 90 mya, when the uplift of the Rocky Mountains began in Western Montana. In Musselshell County, marine deposition ended with the Hell Creek Formation, the last unit to be deposited in the late-Cretaceous Period.

As the mountains to the west were rising, rivers were extending to the east and depositing enormous volumes of sediment on a gently sloping plain. Sandstone was deposited in river channels and dunes, and mud was deposited across the landscape during flood events.

Volcanism occurring to the west spread thick layers of volcanic ash over this area. Bentonite, which is derived from weathered volcanic ash, occurs in many of the Cretaceous-aged sediments, particularly the marine shales. It is found in layers from a few inches thick to mineable beds up to 10-feet thick.

The Cretaceous Period ended approximately 67 mya with a decline in the intense mountain building activity and the extinction of the dinosaurs. While the fossils changed significantly, the character of the sediments remained the same as the deposition of massive amounts of sediment from the uplifting Rocky Mountains continued.

At the beginning of the Tertiary Period, 67 to approximately 2 mya, there was still a shallow sea to the east, and the climate was warm and wet. Swamps developed along the rivers and the coastal plain, containing abundant subtropical vegetation. As the sluggish rivers shifted and meandered, this vegetation was buried by the accumulating sediment and eventually converted to coal.

Fifty mya, after a relatively quiet period in the early-Tertiary Period, a major uplift occurred caused by compressional forces from the west. Volcanism increased, and the region rose several thousand feet. Large fault systems and broad folds were developed. The climate became dry, erosion increased, and the streams in Eastern Montana began downcutting into the soft sedimentary plain.

Alternating periods of wet and dry climates continued, changing the depositional and erosional patterns of the mid- to late-Tertiary Period. Most of those rocks have since been eroded; the youngest consolidated bedrock we see today in Musselshell County is from the early-Tertiary Period.

The climate remained mild and dry from 40 to 25 mya and large quantities of sediment were deposited across the Great Plains. Approximately 25 mya, the weather turned hot and wet and remained that way for 10 million years. Rolling landscapes developed as rivers began eroding valleys into a lush, tropical landscape. Then, 15 mya the climate changed again, becoming extremely dry and probably colder. There was little plant cover and flash floods spread blankets of gravel across the landscape, forming the high plains. No permanent channels were established as gravel choked the streams, and they shifted with every flood event.

Two to three mya, the climate became wetter again and the Quaternary Period began. Plant cover was reestablished, minimizing erosion. Streams became entrenched, beginning to form the channels seen today. Since then, cold, wet ice ages have alternated with drier interglacial periods. Geologists estimate that there may have been up to 20 separate ice ages affecting Montana in the last three million years. (Alt, 1984.) Quaternary-aged deposits include the oldest known glacial deposits in Montana.

Glacial ice repeatedly advanced and retreated over northern Montana during the Pleistocene Epoch, the earliest of two epochs within the Quaternary Period, which lasted until 10,000 years ago. In a relatively early glacial advance, an ice dam on the Missouri River impounded Glacial Lake Musselshell in the area around and south of the Little Rocky Mountains. Water backed up into the northeast portion of Musselshell County. The fine-grained sediments that must have settled to the bottom of this lake have since been eroded; however, boulders dropped from icebergs floating in the lake are still scattered across the landscape.

Today, Musselshell County is geologically quiet. It lies in a tectonically stable area, with no active glaciation, and there has been little or no change to the pattern of the rivers in the Great Plains since the last glacial time. Presently, the streams are in a cycle of downcutting, depositing alluvium along the stream channels during periods of flooding. It is reasonable to expect that within the lifetime of the next several generations, there will be no major changes to the landscape.

Geologic Structure

The bedrock underlying Musselshell County has been folded into a variety of geologic structures, which are frequently associated with economic deposits of oil, gas, or coal. The major structures are the Bull Mountain Basin, occupying the area south of the Musselshell River, and the Willow Creek Syncline, trending northwest to southeast through the northern portion of the county then turning east near the Lake Mason Wildlife Refuge. There is a major fault near the bottom of the Willow Creek Syncline that extends along most of its length and is downdropped to the south.

Devils Pocket Anticline and Pole Creek Anticline were formed during the Big Snowy Uplift and project into the northwestern corner of the county. To the north of Willow Creek Syncline are Devils Basin Anticline, Big Wall Dome, and Ivanhoe Dome north of Melstone. The Gage Dome lies between Willow Creek Syncline and Bull Mountain Basin, south of Big Wall Dome.

Geologic Units

The sequence of rocks exposed in Musselshell County is summarized below, listed in order of decreasing age. Formations are defined as a succession of strata distinctive enough to constitute a basic unit for mapping, identified by similar rock type and stratigraphic section. Formations can be combined into groups or subdivided into members. Systems are the rocks deposited during a particular geologic period.

Representative soil series are listed for each formation. In some cases, outcrop areas for a particular formation are small and difficult to differentiate in the field. In these cases, no soil series are correlated with the formation.

Paleozoic "Ancient Life" System (570 to 245 mya)

The oldest rocks in Musselshell County are the massive limestones of the Mission Canyon Formation of the Madison Group. These rocks were deposited in the Mississippian Period, 360-320 mya. These rocks outcrop in the Little Snowy Mountains and are associated with a reddish soil zone at the top of the formation. Typical soils derived from this formation include the Hughesville, Tibs, and Whitecow series.

The complete Mississippian System is over 2,500-feet thick in northeastern Musselshell County, and several of its formations are oil and gas producing. The overlying Pennsylvanian-aged rocks are 500-feet thick. This sequence of formations is softer and less resistant to erosion so does not have a significant area of outcrop in Musselshell County. Rocks deposited during the Permian Period were removed by erosion during the Jurassic Period.

Mesozoic "Middle Life" System (245 to 66 mya)

Triassic Period (245-208 mya)

Rocks deposited during the Triassic Period were also removed by erosion during the Jurassic Period.

Jurassic Period (208-144 mya)

Jurassic-aged rocks are 500-feet thick in northwestern Musselshell County and thicken to approximately 700-feet in the southeastern corner of the county. These rocks consist of the marine Ellis Group that has been subdivided into the Piper, Rierdon, and Swift Formations, overlain by the nonmarine Morrison Formation. In Musselshell County, they outcrop only in a thin band at the base of the Little Snowy Mountains and consequently are not associated with a particular soil series.

The Piper Formation consists of a lower red bed and gypsum member; a middle member composed of gray shale, limestone, and dolomite; and an upper red bed and gypsum member. It is the eastern, stratigraphic equivalent of the Sawtooth Formation that is composed of marine sandstone and crops out in the mountains to the west.

The Rierdon Formation consists of fossiliferous limestones or limy shales that are thin, hard, and platy in outcrop.

The Swift Formation consists of a light-colored, fossiliferous sandstone or coquina and is very porous.

The Morrison Formation is nonmarine and consists of multicolored mudstone with lesser amounts of sandstone, carbonate rock, slightly carbonaceous mudstone, and some coal. This formation can be seen in outcrop as light yellow to tan, purple and brick red slopes near the base of the Little Snowy Mountains.

Cretaceous Period (144-67 mya)

The Kootenai Formation consists of red and green shales that contain large, fairly continuous sandstone channels. This Central Montana oil-producing formation has a basal conglomerate or sandstone that is locally and informally designated as the Third Cat Creek Sand by the petroleum industry. It is approximately 450-feet thick in northwestern Musselshell County, thinning to 200 feet in the southeastern corner. Typical soils derived from this formation include the Fergus, Kuro, and Wayden series.

The overlying Fall River Sandstone is a fine-grained, finely laminated, yellowish-brown sandstone that is composed primarily of quartz. It is approximately 70-feet thick. Typical soils derived from this formation include the Bitton, Castner, and Winifred series.

The Colorado Group is a sequence of formations composed primarily of marine shale that is 1,880-feet thick. It has been subdivided into six formations: Thermopolis Shale, Mowry Shale, Belle Fourche Shale, Greenhorn Formation, Carlile Shale, and Niobrara Formation. It is exposed along the central portion of the northern border of Musselshell County. Devils Basin has been eroded almost completely through the Colorado Group, and its sequence of shales and sandstones are exposed in descending order. The relatively thin sandstone beds form small, concentric ridges within the basin. Typical soils derived from this group of formations include the Neldore, Volborg, and Zatoville series.

The Montana Group overlies the Colorado Group and contains marginal marine and continental deposits. It has been subdivided into six formations: Telegraph Creek Formation, Eagle Formation, Claggett Shale, Judith River Formation, Bearpaw Shale, and Fox Hills Sandstone. The formations crop out in a band that stretches across the northern central tier of the county and occupies the northeastern portion of the county north of the Musselshell River.

The oldest formation, Telegraph Creek Formation, is a transitional unit between the Niobrara Shale and the sandstones of the overlying Eagle Formation. It consists of sandy shales that weather to light gray with brick-red concretions at the base. The formation becomes sandier upward toward the base of the Eagle Formation. Typical soils derived from the Telegraph Creek Formation include the Cabbart, Gerdrum, and Yawdim series.

The Eagle Formation generally consists of light gray basal sandstone, a middle unit of shale with interbeds of sandstone and siltstone, and an upper unit of shaley sandstone with interbeds of shale. East of the Musselshell River, the formation is primarily shale. The basal sandstone forms the Big Wall just south of North Willow Creek. Total thickness of the formation is approximately 450-feet in Musselshell County, thickening to the east. Typical soils derived from this formation include the Blacksheep, Cabbart, and Eapa series.

The Claggett Formation consists of gray shales that weather to a velvety brown and contains highly fractured orange ironstone concretions. In the upper portion of the formation, the concretions are white and the size of footballs. Total thickness is approximately 750 feet. Typical soils derived from this formation include the Gerdrum, Neldore, and Volborg series.

The Judith River Formation consists predominantly of carbonaceous mudstone, with some coal, and large, fairly continuous sandstone channels. The sandstone characteristically weathers to a darker brown than the sandstone of the Eagle Formation and has a dirtier appearance. It is approximately 400-feet thick. Typical soils derived from this formation include the Busby, Cabbart, and Twilight series.

The Bearpaw Shale is composed of 600 to 700 feet of gray to black, bentonitic shales. The upper portion of the formation has increased sand content and is fossiliferous. Typical soils derived from this formation include the Abor, Gerdrum, Marvan, and Neldore series.

The Fox Hills Formation is the youngest member of the Montana Group. It is composed of fine- to medium-grained sandstone that weathers to light tan to orange, with interbedded gray shale. It is 150-feet thick in this area. It is poorly consolidated and consequently does not form prominent ridges; however, it is used extensively as an aquifer. Typical soils derived from this formation include the Blacksheep, Marmarth, and Twilight series.

The Hell Creek Formation, 200- to 600-feet thick, overlies the Fox Hills Formation. It was the last formation to be deposited in the Cretaceous Period before the final marine withdrawal. It is composed primarily of soft, fine- to medium-grained, gray to brown lenticular sandstone, interbedded with green to gray claystone and sandy shale. Sandstone beds are often over 25-feet thick. Thin, discontinuous coal seams, carbonaceous shales, and bentonite are also common within the formation. Typical soils formed on the sandstone bedrock include the Cabbart and Delpoint series. Typical soils formed on the shale bedrock include the Gerdrum, Tanna, and Yawdim series.

Cenozoic "Recent Life" System (66 mya to present)

Tertiary Period (67-1.6 mya.)

The remainder of the survey area is covered by the Fort Union Formation. It is more than 2,000-feet thick and has been subdivided on the basis of color, topography, and the occurrence of coal. The members are the basal Tullock Member, the Lebo Shale, and the upper Tongue River Member.

The Tullock Member consists of 180- to 200-feet of light yellow, fine-grained sandstone and siltstone, interbedded with gray sandy or silty shale. It contains thin but laterally persistent coal beds that grade upward into light gray, carbonaceous shale. Typical soils derived from the Tullock Member include the Cabbart, Marmarth, and Yawdim series.

The Lebo Member consists of approximately 200 feet of dark gray, alkaline shale with thin interbeds of fine-grained sandstone, sandy shale, and coal. Calcareous and ironstone concretions are characteristic and weather to small, reddish-brown fragments covering outcrop slopes. In most areas, the Lebo Member is easily distinguished from the other members of the Fort Union Formation as it is darker in color and contains more clay. Sparsely vegetated badlands are commonly formed in Lebo outcrop. Typical soils derived from this formation include the Cabbart, Delpoint, and Yawdim series.

The uppermost Tongue River Member is the thickest of the Fort Union members and is the youngest bedrock exposed in Musselshell County. It consists of 700 to 1,400 feet of soft, light-colored, fine- to medium-grained sandstone with siltstone interbeds. It contains coal seams that are thicker and more persistent than those in the Tullock Member. Some of the coal is of economic importance.

The sandstone is thick bedded, locally crossbedded, and lenticular. In the Bull Mountains, the Tongue River Member contains more thick sandstone beds than in other areas, and they are uncharacteristically continuous. The sandstone beds represent old stream channels, and most grade laterally into siltstone and shale. Typical soils that developed on the sandstone bedrock include the Blacksheep, Dast, and Ridge series. Typical soils that developed on shalier bedrock include the Barvon, Cabba, and Yamacall series.

Upper Tertiary and Quaternary Deposits (38 mya to present)

There are unconsolidated terrace deposits of late-Tertiary to early-Quaternary age on some valley sides and upland areas along the Musselshell River. These deposits are remnants of former flood plains and consist predominantly of gravel interbedded with sand, silt, and clay. Typical soils derived from these deposits include the Crago, Marias, and Musselshell series.

Southeast of the Little Snowy Mountains, there are extensive gravel terraces that rise gradually and become more continuous toward the mountains. Typical soils derived from these deposits include the Attewan, Crago, and Musselshell series.

Alluvial deposits formed in the last 10,000 years can be found along the Musselshell River and its tributaries. The most extensive alluvial deposits occur near the Musselshell River. They are unconsolidated and consist of clay, silt, and sand with local lenses of gravel. Typical soils derived from these deposits include the Glendive, Harlake, and Havre series.

Coal, Oil, and Natural Gas Resources

Fossil fuels have played an important part in the development of Musselshell County. Extensive coal deposits have been mined in the Bull Mountains since the late 1800s, and there are fifteen active oil fields in the northern portion of the county.

Coal was reported in the Bull Mountains in 1873, and geologic mapping was initiated in 1881. Ranchers and homesteaders, who excavated small outcrops for their own use, originally mined the coal. The first commercial mine opened in 1907 to provide fuel for the railroads. Most of the coal was mined by underground methods. Several coal mines operated for the first part of this century; however, the demand diminished in the 1950s as the railroads converted to diesel fuel. The last major mine closed in the mid-1960s; since then, mining has been ongoing but sporadic, involving only small volumes for local use.

The coal is subbituminous, relatively low in sulfur, and is in compliance with the United States Environmental Protection Agency's requirements for sulfur content. It is mined from the Tongue River Member of the Fort Union Formation that contains 26 persistent coal beds ranging from 1- to 15-feet thick. Most of the coal beds are lenticular and vary in thickness at different points along the bed. Three of these beds are thick enough to be mined with current technology.

Musselshell County still has significant coal reserves; however, their development will be dependent on the market, particularly the demand for specialty coal. Development of more efficient underground mining technology may enable the thinner coal seams to be commercially mined in the future.

Geologic structures favorable for the accumulation of oil were recognized in Musselshell County in the early 1900s. No direct surface indications were observed; however, hydrogen sulfide gas was known to escape from several springs in the area, and several people reported natural gas in their hand-dug wells. Two wildcat drilling operations were underway by 1915. The Devils Basin field, discovered in 1919, was the first wildcat discovery in Montana. This discovery, and the Cat Creek field discovery in 1920, started a small oil boom that failed to find the reservoirs that are producing today. By the mid-1920s, the surface geology had been mapped, and most operators had left the area.

Exploration began again in the early 1940s due to increased demand caused by World War II. The first discovery in Central Montana during this period was the Gage Dome field, also in Musselshell County. Discovery of the Ragged Point field followed in 1948. The oil fields in production today were discovered in the period between 1948 and 1974.

Ground Water Resources

The most productive wells in Musselshell County are developed from alluvial gravels along the Musselshell River flood plain. Quantities of water suitable for stock and domestic use can be developed from sandstone and coal beds within the Tongue River Member of the Fort Union Formation and the Hell Creek and Fox Hills Formations. In the Tongue River Member, well depth is partially dependent on the topography, particularly on the relative position of the well with respect to the nearest stream. In general, drilling on ridgetops or divides results in the deepest wells with the greatest pump lifts in the area.

Most of the water developed from bedrock sources in this area is high in calcium and magnesium and is therefore hard and unsatisfactory for domestic use or irrigation. The water can be used successfully by most livestock.

Seismic Activity

Musselshell County lies in a seismically inactive area. The Earthquake Studies Office of the Montana Bureau of Mines and Geology maintains a network of seismographs throughout the State of Montana. There have been no earthquakes of any size recorded with epicenters in Musselshell County since the network began in 1982. While the historical record is very short, there is no evidence to indicate active seismicity in Musselshell County.

Climate

The table, “Temperature and Precipitation,” gives data on temperature and precipitation in the survey area as recorded at Roundup and Melstone, Montana. Other tables, “Freeze Dates in Spring and Fall” and “Growing Season,” show probable dates of the last spring freeze and the first fall freeze and provide data on length of the growing season, respectively.

Growing degree days are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total average annual precipitation for Roundup during the period 1948 to 1995 is 12.51 inches. Of this, 9.63 inches, or 77 percent, usually falls from April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall is less than 9.32 inches.

The total average annual precipitation for Melstone during the period 1948 to 1995 is 14.32 inches. Of this, 10.51 inches, or 73 percent, usually falls from April through September. In 2 years out of 10, the rainfall is less than 10.36 inches.

During winter, the average January temperature for Roundup is 23.3 degrees F, and the average daily minimum temperature is 10.9 degrees F. The average January temperature for Melstone is 20.8 degrees F, and the average daily minimum temperature is 8.9 degrees F. During summer, the average July temperature for Roundup and Melstone is approximately 71.0 degrees F.

The average seasonal snowfall is 15.7 inches at Roundup with an average of 7 days per year that have at least 1 inch of snow on the ground. The average seasonal snowfall is 46.1 inches at Melstone with an average of 57 days per year that have at least 1 inch of snow on the ground.

Temperature and Precipitation

(Recorded in the period 1948-1995 at Melstone and Roundup, Montana.)

Month	Temperature (Degrees F.)					Precipitation (Inches)					
	Average daily maximum	Average daily minimum	Average	2 yrs in 10 will have max. temp. more than	2 yrs in 10 will have min. temp. less than	Average number of growing degree days*	Average	2 years in 10 will have Less than	2 years in 10 will have More than	Average number of days with 0.10 or more	Average total snow fall
MELSTONE:											
January	32.7	8.9	20.8	62	-31	15	0.58	0.21	0.89	2	9.0
February	39.9	14.9	27.4	69	-23	27	0.45	0.20	0.69	1	6.6
March	47.9	22.1	35.0	75	-14	67	0.72	0.30	1.08	2	7.4
April	59.9	31.5	45.7	85	11	211	1.42	0.54	2.15	4	5.4
May	70.2	41.4	55.8	93	24	488	2.48	1.25	3.56	5	1.2
June	79.5	49.9	64.7	99	35	731	2.56	1.34	3.63	6	0.0
July	88.2	54.9	71.6	104	40	952	1.47	0.46	2.29	4	0.0
August	87.4	53.4	70.4	103	38	921	1.25	0.46	1.90	3	0.0
September	75.6	43.4	59.5	98	25	578	1.33	0.40	2.14	3	0.3
October	63.8	33.5	48.6	88	11	293	0.89	0.34	1.46	2	2.4
November	46.9	22.2	34.6	73	-12	60	0.57	0.29	0.89	2	4.9
December	36.9	13.4	25.1	64	-26	18	0.59	0.18	0.92	2	8.9
Yearly:											
Average	60.7	32.4	46.6	----	----	----	----	----	----	----	----
Extreme	110	-43	----	105	-34	----	----	----	----	----	----
Total	----	----	----	----	----	4,360	14.32	10.36	17.30	36	46.1
ROUNDUP:											
January	35.7	10.9	23.3	62	-30	17	0.40	0.13	0.70	1	4.9
February	42.4	16.4	29.4	68	-22	32	0.31	0.10	0.52	1	2.5
March	49.0	22.1	35.5	74	-14	73	0.53	0.16	0.84	1	2.2
April	60.3	31.7	46.0	84	12	219	1.09	0.45	1.63	3	1.2
May	70.4	41.3	55.8	92	24	491	2.22	0.92	3.32	5	0.0
June	79.2	49.4	64.3	98	35	721	2.38	1.19	3.42	5	0.0
July	87.7	54.4	71.1	103	41	954	1.53	0.49	2.38	4	0.0
August	87.2	52.3	69.7	102	37	911	1.26	0.46	1.97	3	0.0
September	75.6	42.5	59.0	97	25	567	1.15	0.37	1.79	2	0.0
October	64.4	33.4	48.9	87	10	300	0.84	0.28	1.34	2	0.3
November	47.8	22.7	35.3	72	-11	66	0.40	0.13	0.70	1	1.1
December	38.7	14.8	26.8	63	-26	21	0.40	0.14	0.71	1	3.5
Yearly:											
Average	61.5	32.6	47.1	----	----	----	----	----	----	----	----
Extreme	109	-44	----	104	-34	----	----	----	----	----	----
Total	----	----	----	----	----	4,373	12.51	9.32	15.34	29	15.7

*A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (Threshold: 40.0 degrees F).

Freeze Dates in Spring and Fall

(Recorded in the period 1948-1995 at Melstone and Roundup, Montana.)

Probability	Temperature		
	24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
MELSTONE:			
Last freezing temperature in spring:			
1 year in 10 later than----	May 11	May 17	May 30
2 years in 10 later than---	May 5	May 12	May 24
5 years in 10 later than---	April 23	May 2	May 14
First freezing temperature in fall:			
1 year in 10 earlier than--	September 25	September 17	September 8
2 years in 10 earlier than-	September 30	September 22	September 13
5 years in 10 earlier than-	October 11	October 2	September 22
ROUNDUP:			
Last freezing temperature in spring:			
1 year in 10 later than----	May 5	May 16	May 29
2 years in 10 later than---	April 30	May 11	May 24
5 years in 10 later than---	April 20	May 2	May 13
First freezing temperature in fall:			
1 year in 10 earlier than--	September 23	September 14	August 29
2 years in 10 earlier than-	September 29	September 19	September 4
5 years in 10 earlier than-	October 10	September 29	September 16

Growing Season

(Recorded in the period 1961-1990 at Blackleaf, Choteau Airport, Conrad, Fairfield, and Valier, Montana.)

Probability	Daily Minimum Temperature Higher than 24 degrees F	 Higher than 28 degrees F	 Higher than 32 degrees F
	Days	Days	Days
BLACKLEAF:			
9 years in 10	127	97	66
8 years in 10	134	104	75
5 years in 10	149	119	91
2 years in 10	163	133	108
1 year in 10	171	140	117
CHOTEAU AIRPORT:			
9 years in 10	147	126	101
8 years in 10	156	135	108
5 years in 10	174	151	122
2 years in 10	191	168	136
1 year in 10	200	177	144
CONRAD:			
9 years in 10	134	112	81
8 years in 10	141	118	89
5 years in 10	156	130	105
2 years in 10	170	141	122
1 year in 10	178	147	130
FAIRFIELD:			
9 years in 10	146	126	99
8 years in 10	156	134	106
5 years in 10	174	151	120
2 years in 10	192	167	135
1 year in 10	202	175	142
VALIER:			
8 years in 10	155	132	105
5 years in 10	168	145	119
2 years in 10	182	157	133
1 year in 10	190	163	140

Formation and Classification of the Soils

This section relates the soils in the survey area to the major factors of soil formation and describes the system of soil classification. The classification and extent of the soils in this survey area are shown in the tables “Classification of the Soils” and “Acreage and Proportionate Extent of the Soils” at the end of this section.

Formation of the Soils

Soil is a natural, three-dimensional body on the earth’s surface that supports or is capable of supporting plants. Physical and chemical processes have determined its morphology. These processes have resulted from the interaction of five factors—parent material, climate, living organisms, relief, and time. Differences between soils can be traced to differences in one or more of these factors.

Climate and plant and animal life are active factors in soil formation. They act on parent material through weathering, slowly changing it into a natural body with individual, related horizons. Relief and time condition the effects of climate and plant and animal life. Parent material affects the kind of soil that forms; it is the dominant factor in young soils, but its influence generally lessens as the soil develops. Time is necessary for the formation of a soil, but the length of time required depends upon the other factors of soil formation.

Climate

Mainly temperature and precipitation determine climate, an active force in the formation of soils. Soils form in rocks that have been broken into suitable materials by erosion and alternate freezing and thawing. Water and wind are active agents in transporting and separating weathered material. This weathered material is further broken down by chemical reactions, such as solution and hydration.

Precipitation and temperature affect the kind and amount of vegetation that grows on the soil. Vegetation decays to produce organic matter in the soil. Soils that have cool temperatures and high precipitation generally contain more organic matter and are dark colored. Soils with warm temperature and low precipitation generally contain less organic matter and are light colored.

Living Organisms

Living organisms are active in the formation of soils. Plants, animals, insects, and microorganisms affect gains or losses in organic matter, plant nutrients in the soil, and changes in porosity and structure.

Roots, rodents, and insects penetrate the soil and alter its structure. Leaves, roots, and entire plants that remain in the surface layer are changed to humus by microorganisms, chemicals in the soil, and insects. Fungi and algae also contribute to the decomposition of bedrock. Animals increase porosity by burrowing through the soil and leaving open channels for the movement of water and air.

Topography

The uplift of mountain masses and the resistance of bedrock and geologic formations to erosion by water and wind determine topography, or relief. In the eroded uplands of the survey area, runoff water has carved deep valleys into the original bedrock. The rugged relief contrasts sharply with the smooth, low relief of the stream terraces and flood plains along the river valleys.

On uplands, soil horizons decrease in number, distinctness, and thickness as slope increases. Steep soils that have rapid runoff have many characteristics similar to those of soils that formed in arid climates. Nearly level to moderately sloping soils that receive runoff water from soils above them have many characteristics of soils that formed in more humid climates.

Parent Material

Many of the soils in this survey area formed in place over semiconsolidated sedimentary beds or shale. Some soils formed in alluvium and colluvium and were deposited in major valleys and on bordering uplands. Soils that formed in material derived from semiconsolidated, sandy sedimentary beds are generally sandy. Soils that formed in residuum derived from shale are clayey. The basic constituent of shale is clay. Soils that formed in mixed alluvium derived from semiconsolidated, loamy sedimentary beds are loamy. Some of the soils in the area acquired salt and sodium from the parent material. The salts and sodium in these saline, alkaline, or saline-alkaline soils limit the kind and amount of plants that can grow on them. The density of the parent rock and its mineral composition can limit the rate of weathering and the depth of the soil.

Time

The changes that take place in a soil over long periods of time are called soil genesis. Distinct horizons, or layers, develop in the soils as a result of these changes. The length of time that parent materials have been in place and exposed to climate and living organisms is generally reflected in the degree to which the soil profile has developed. The kinds and arrangement of layers are called the soil morphology, and they are described in terms of color, texture, structure, consistency, thickness, permeability, and chemistry.

Soils can be classified from young to mature. The age of a soil is determined from the thickness of the A horizon, the content of clay and organic matter, the depth to which soluble material is leached, and the form and distribution of calcium carbonate and gypsum in the soil.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1975) (USDA, 1996). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol, from *ent*, meaning recent.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Orthent (*Orth*, meaning common, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Ustorthents (*Ust*, meaning ustic moisture regime, plus *orthents*, the suborder of the Entisols.

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Ustorthents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, thickness of the root zone, cation exchange activity class, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is loamy, mixed (calcareous), superactive, frigid, shallow Typic Ustorthents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series. An example is the Cabba series. The Cabba series is a loamy, mixed, calcareous, superactive, frigid, shallow, Typic Ustorthent.

Classification of the Soil

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics outside the range of the series.)

Soil name	Family or higher taxonomic class
Abor	Fine, smectitic, frigid Leptic Udic Haplusterts
Absher	Fine, smectitic, frigid Torrertic Natrustalfs
Attewan	Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aridic Argiborolls
Barvon	Fine-loamy, mixed, superactive Entic Haploborolls
Binna	Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aridic Calciborolls
Bitton	Loamy-skeletal, mixed, superactive Typic Haploborolls
Blacksheep	Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents
Borky	Clayey-skeletal, mixed, superactive Typic Argiborolls
Bullhook	Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Busby	Coarse-loamy, mixed, superactive, frigid Aridic Ustochrepts
Cabba	Loamy, mixed, calcareous, superactive, frigid, shallow Typic Ustorthents
Cabbart	Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents
Castner	Loamy-skeletal, mixed, superactive Lithic Haploborolls
Chinook	Coarse-loamy, mixed, superactive Aridic Haploborolls
Crago	Loamy-skeletal, carbonatic, frigid Haplocalcidic Ustochrepts
Creed	Fine, smectitic, frigid Aridic Natrustalfs
Dast	Coarse-loamy, mixed, superactive, frigid Typic Ustochrepts
Delplain	Clayey-skeletal, mixed, nonacid, superactive, frigid Lithic Ustorthents
Delpoint	Fine-loamy, mixed, superactive, frigid Aridic Ustochrepts
Doney	Fine-loamy, mixed, superactive, frigid Typic Ustochrepts
Eapa	Fine-loamy, mixed, superactive Aridic Argiborolls
Ethridge	Fine, smectitic Torrertic Argiborolls
Fergus	Fine, mixed, superactive Typic Argiborolls
Gerdrum	Fine, smectitic, frigid Torrertic Natrustalfs
Glendive	Coarse-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Harlake	Fine, smectitic, calcareous, frigid Aridic Ustifluvents
Havre	Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Hilger	Loamy-skeletal, mixed, superactive Typic Argiborolls
Hinterland	Clayey, smectitic Lithic Argiborolls
*Hughesville	Loamy-skeletal, carbonatic Udic Haploborolls
Kobase	Fine, smectitic, frigid Torrertic Ustochrepts
Korchea	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Ustifluvents
Kremlin	Fine-loamy, mixed, superactive Aridic Haploborolls
Kuro	Clayey, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents
Lamedeer	Loamy-skeletal, mixed, superactive, frigid Typic Ustochrepts
Lostriver	Fine, smectitic, calcareous, frigid Aridic Ustifluvents
Macar	Fine-loamy, mixed, superactive, frigid Typic Ustochrepts
Macmeal	Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs
Marias	Fine, smectitic, frigid Chromic Udic Haplusterts
Marmarth	Fine-loamy, mixed, superactive Aridic Argiborolls
Marvan	Fine, smectitic, frigid Sodic Haplusterts
McKenzie	Fine, smectitic, frigid Chromic Endoaquerts

Classification of the Soil--Continued

Soil name	Family or higher taxonomic class
Megonot	Fine, smectitic, frigid Torrertic Ustochrepts
Musselshell	Coarse-loamy, carbonatic, frigid Haplocalcidic Ustochrepts
Neldore	Clayey, smectitic, nonacid, frigid, shallow Aridic Ustorthents
Niart	Fine-loamy, carbonatic Aridic Calciborolls
Nobe	Fine, smectitic, calcareous, frigid Vertic Ustorthents
Orinoco	Fine, smectitic, calcareous, frigid Vertic Ustorthents
Rentsac	Loamy-skeletal, mixed, superactive, calcareous, frigid Lithic Ustorthents
Ridge	Loamy, mixed, superactive, frigid, shallow Typic Ustochrepts
Ringling	Loamy-skeletal over fragmental, mixed, superactive Typic Haploborolls
Rothiemay	Fine-loamy, mixed, superactive Aridic Calciborolls
Savage	Fine, smectitic Vertic Argiborolls
Shambo	Fine-loamy, mixed, superactive Typic Haploborolls
Sinnigam	Clayey-skeletal, mixed, superactive Lithic Argiborolls
Straw	Fine-loamy, mixed, superactive Cumulic Haploborolls
Tanna	Fine, smectitic Aridic Argiborolls
Tibs	Clayey-skeletal, mixed, superactive, calcareous, frigid Typic Ustorthents
Twilight	Coarse-loamy, mixed, superactive, frigid Aridic Ustochrepts
Vanda	Fine, smectitic, calcareous, frigid Vertic Ustorthents
Verson	Clayey over loamy-skeletal, mixed, superactive Aridic Argiborolls
Volborg	Clayey, smectitic, acid, frigid, shallow Aridic Ustorthents
Warhorse	Clayey, smectitic, frigid, shallow Aridic Haplustalfs
Wayden	Clayey, smectitic, calcareous, frigid, shallow Typic Ustorthents
Weingart	Fine, smectitic, frigid Torrertic Natrustalfs
Whitecow	Loamy-skeletal, carbonatic, frigid Calcic Ustochrepts
Windham	Loamy-skeletal, carbonatic Typic Calciborolls
Winifred	Fine, smectitic Vertic Haploborolls
Yamacall	Fine-loamy, mixed, superactive, frigid Aridic Ustochrepts
Yawdim	Clayey, smectitic, calcareous, frigid, shallow Aridic Ustorthents
Zatoville	Fine, smectitic, frigid Torrertic Ustochrepts

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
1E	Badland	1,158	*
2E	Rock outcrop	750	*
3A	Riverwash	295	*
5A	Harlake silty clay, 0 to 2 percent slopes	717	*
6A	Harlake silty clay, 0 to 2 percent slopes, occasionally flooded	18	*
7A	Lostriver silty clay, 0 to 2 percent slopes	1,282	0.1
7B	Lostriver-Bullhook complex, 0 to 2 percent slopes	3,768	0.3
8A	Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded	2,560	0.2
8B	Harlake-Havre complex, 0 to 2 percent slopes	2,300	0.2
9A	Havre loam, 0 to 2 percent slopes	4,143	0.3
9B	Havre-Yamacall loams, 0 to 4 percent slopes	5,689	0.5
10A	Havre loam, 0 to 2 percent slopes, occasionally flooded	519	*
11A	Havre-Glendive complex, 0 to 2 percent slopes	5,093	0.4
11B	Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded	566	*
12A	Havre-Harlake complex, channeled, 0 to 2 percent slopes	5,856	0.5
13A	Havre loam, calcareous, 0 to 2 percent slopes	3,974	0.3
14A	Havre, calcareous-Glendive complex, 0 to 2 percent slopes	1,841	0.2
14B	Havre, calcareous-Glendive complex, 0 to 2 percent slopes, occasionally flooded	401	*
15A	Havre-Harlake complex, calcareous, 0 to 2 percent slopes	1,025	*
16A	Havre-Yamacall loams, calcareous, 0 to 4 percent slopes	1,137	*
17A	Harlake-Havre complex, calcareous, 0 to 2 percent slopes	714	*
20B	Harlake-Marvan-Vanda silty clays, 0 to 4 percent slopes	2,690	0.2
21A	McKenzie silty clay, 0 to 2 percent slopes	3,482	0.3
22B	Nobe-Absher complex, 0 to 4 percent slopes	5,515	0.5
23A	Gerdrum-Vanda complex, 0 to 8 percent slopes	16,076	1.3
23B	Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes	19,053	1.6
23C	Gerdrum-Creed loams, 0 to 8 percent slopes	7,754	0.6
25A	Vanda silty clay, 0 to 4 percent slopes	2,918	0.2
26A	Weingart loam, 1 to 8 percent slopes	1,199	0.1
26B	Weingart-Warhorse loams, 1 to 8 percent slopes	214	*
30C	Busby fine sandy loam, 2 to 8 percent slopes	2,531	0.2
30D	Busby fine sandy loam, 8 to 15 percent slopes	609	*
31B	Delpoint loam, 2 to 8 percent slopes	5,164	0.4
31C	Delpoint-Cabbart-Yamacall loams, 4 to 15 percent slopes	25,801	2.2
32B	Twilight sandy loam, 2 to 8 percent slopes	3,356	0.3
32D	Twilight-Blacksheep-Rock outcrop complex, 4 to 25 percent slopes	7,044	0.6
33A	Yamacall loam, 0 to 2 percent slopes	1,854	0.2
33B	Yamacall loam, 2 to 8 percent slopes	12,567	1.0
34A	Yamacall clay loam, 0 to 2 percent slopes	896	*
34B	Yamacall clay loam, 2 to 8 percent slopes	3,076	0.3
35B	Yamacall-Busby complex, 2 to 8 percent slopes	5,490	0.5
36B	Yamacall-Delpoint loams, 2 to 8 percent slopes	21,257	1.8
37A	Yamacall clay loam, calcareous, 0 to 2 percent slopes	953	*
37B	Yamacall clay loam, calcareous, 2 to 8 percent slopes	888	*
38A	Kobase-Zatoville silty clay loams, 0 to 8 percent slopes	7,262	0.6
38B	Zatoville silty clay loam, 0 to 8 percent slopes	5,915	0.5
39B	Delpoint loam, calcareous, 2 to 8 percent slopes	1,174	*
39C	Delpoint, calcareous-Cabbart-Yamacall loams, 4 to 15 percent slopes	14,964	1.2
40B	Kobase silty clay loam, 0 to 8 percent slopes	7,535	0.6
40C	Kobase silty clay loam, calcareous, 0 to 8 percent slopes	2,399	0.2
41A	Yamacall loam, calcareous, 0 to 2 percent slopes	2,017	0.2
41B	Yamacall loam, calcareous, 2 to 8 percent slopes	7,140	0.6
41C	Yamacall-Delpoint loams, calcareous, 2 to 8 percent slopes	7,930	0.7
50B	Hinterland loam, 1 to 6 percent slopes	1,579	0.1
50C	Hinterland loam, 6 to 15 percent slopes	421	*
50D	Hinterland-Delplain complex, 8 to 25 percent slopes	1,316	0.1
51A	Ethridge clay loam, 0 to 2 percent slopes	3,351	0.3
51B	Ethridge clay loam, 2 to 8 percent slopes	5,621	0.5
52A	Eapa loam, 0 to 2 percent slopes	1,607	0.1
52B	Eapa loam, 2 to 8 percent slopes	7,655	0.6

* See footnote at end of table

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
53A	Tanna loam, 1 to 6 percent slopes	1,127	*
54A	Marmarth fine sandy loam, 0 to 8 percent slopes	2,604	0.2
56A	Crago-Musselshell-Attewan complex, 0 to 2 percent slopes	15,330	1.3
57A	Attewan loam, 0 to 4 percent slopes	2,522	0.2
57B	Attewan cobbly loam, 0 to 4 percent slopes	46	*
57C	Attewan-Niart loams, 0 to 4 percent slopes	3,828	0.3
58A	Verson clay loam, 0 to 4 percent slopes	3,465	0.3
60B	Abor silty clay, 1 to 8 percent slopes	7,614	0.6
60C	Abor-Neldore silty clays, 2 to 8 percent slopes	20,097	1.7
60D	Neldore-Abor silty clays, 4 to 15 percent slopes	28,989	2.4
60E	Neldore-Abor silty clays, 15 to 45 percent slopes	1,270	0.1
61D	Neldore-Neldore, saline silty clays, 4 to 25 percent slopes	6,396	0.5
61E	Neldore-Volborg silty clays, 4 to 25 percent slopes	2,785	0.2
62C	Neldore silty clay, 4 to 25 percent slopes	1,602	0.1
62D	Neldore-Yawdim silty clays, 4 to 25 percent slopes	7,827	0.7
62E	Neldore-Rock outcrop complex, 15 to 45 percent slopes	3,046	0.3
63A	Marias silty clay, 0 to 4 percent slopes	7,888	0.7
64A	Marvan-Vanda silty clays, 0 to 8 percent slopes	21,460	1.8
64B	Marvan silty clay, 0 to 8 percent slopes	13,570	1.1
67D	Yawdim silty clay loam, 4 to 25 percent slopes	2,383	0.2
68C	Megonot-Yawdim silty clay loams, 4 to 15 percent slopes	4,093	0.3
69C	Orinoco-Yawdim silty clay loams, 4 to 15 percent slopes	1,888	0.2
73D	Yawdim-Abor complex, 4 to 15 percent slopes	4,288	0.4
73E	Yawdim-Abor complex, 15 to 60 percent slopes	1,589	0.1
74D	Abor-Crago complex, 2 to 15 percent slopes	5,722	0.5
74E	Abor-Crago complex, 15 to 35 percent slopes	9,807	0.8
80E	Blacksheep-Rock outcrop-Twilight complex, 8 to 45 percent slopes	1,046	*
81B	Delpoint-Cabbart loams, 2 to 8 percent slopes	19,577	1.6
81C	Delpoint-Cabbart loams, 8 to 15 percent slopes	2,329	0.2
81D	Cabbart loam, 4 to 15 percent slopes	3,857	0.3
82B	Cabbart-Delpoint loams, 4 to 15 percent slopes	34,868	2.9
82C	Cabbart-Delpoint-Rock outcrop complex, 4 to 15 percent slopes	21,206	1.8
82E	Cabbart-Delpoint-Rock outcrop complex, 8 to 45 percent slopes	15,840	1.3
83D	Cabbart-Rock outcrop-Blacksheep complex, 8 to 45 percent slopes	5,453	0.5
84C	Cabbart-Yawdim-Delpoint complex, 4 to 15 percent slopes	10,048	0.8
84D	Cabbart-Yawdim-Rock outcrop complex, 4 to 35 percent slopes	14,416	1.2
84E	Cabbart-Yawdim-Delpoint complex, 15 to 35 percent slopes	2,764	0.2
85A	Cabbart clay loam, 0 to 2 percent slopes	682	*
86D	Cabbart-Rentsac complex, 2 to 15 percent slopes	2,649	0.2
86E	Cabbart-Rock outcrop complex, 4 to 35 percent slopes	2,125	0.2
87B	Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes	5,013	0.4
88D	Delpoint-Cabbart-Rock outcrop complex, 4 to 35 percent slopes	1,630	0.1
89C	Rentsac fine sandy loam, 2 to 8 percent slopes	2,886	0.2
90B	Chinook fine sandy loam, 2 to 8 percent slopes	799	*
91A	Kremlin loam, 0 to 2 percent slopes	119	*
91B	Kremlin loam, 2 to 8 percent slopes	659	*
92A	Binna loam, 0 to 4 percent slopes	4,816	0.4
93A	Crago-Musselshell complex, 0 to 4 percent slopes	6,741	0.6
93B	Crago cobbly loam, 1 to 6 percent slopes	535	*
94A	Crago gravely loam, 0 to 8 percent slopes	1,901	0.2
94E	Crago gravelly loam, 8 to 35 percent slopes	1,119	*
95A	Crago-Musselshell cobbly loams, 0 to 4 percent slopes	6,191	0.5
95B	Crago-Attewan-Musselshell cobbly loams, 0 to 4 percent slopes	434	*
95C	Crago-Attewan cobbly loams, 2 to 8 percent slopes	901	*
95E	Yawdim-Crago complex, 4 to 35 percent slopes	8,369	0.7
96E	Crago-Abor complex, 4 to 35 percent slopes	1,636	0.1
97A	Musselshell-Crago cobbly loams, 0 to 4 percent slopes	3,945	0.3
97B	Musselshell-Crago complex, 4 to 8 percent slopes	1,499	0.1
98A	Niart cobbly loam, 0 to 4 percent slopes	7,895	0.7
98B	Niart-Crago complex, 0 to 4 percent slopes	58	*
98C	Niart-Crago complex, 4 to 15 percent slopes	1,446	0.1

* See footnote at end of table

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
98D	Niart-Rothiemay loams, 0 to 4 percent slopes	921	*
123C	Creed-Gerdrum loams, 0 to 8 percent slopes	2,925	0.2
130B	Busby-Twilight complex, 2 to 8 percent slopes	105	*
131C	Delpoint-Yamacall loams, 2 to 8 percent slopes	8,388	0.7
132B	Twilight-Blacksheep sandy loams, 2 to 8 percent slopes	15,199	1.3
138B	Zatoville-Orinoco silty clay loams, 2 to 8 percent slopes	3,580	0.3
140B	Kobase-Megonot silty clay loams, 0 to 8 percent slopes	4,236	0.4
140C	Kobase-Megonot silty clay loams, calcareous, 0 to 8 percent slopes	559	*
142A	Rothiemay loam, calcareous, 0 to 2 percent slopes	23	*
142B	Rothiemay loam, calcareous, 2 to 8 percent slopes	42	*
142C	Rothiemay-Crago complex, 4 to 15 percent slopes	1,025	*
152A	Eapa-Attewan loams, 0 to 2 percent slopes	3,124	0.3
153C	Tanna-Cabbart loams, 2 to 8 percent slopes	1,112	*
153D	Cabbart-Tanna loams, 4 to 15 percent slopes	1,269	0.1
154C	Marmarth-Cabbart loams, 2 to 8 percent slopes	2,922	0.2
154D	Cabbart-Marmarth complex, 4 to 15 percent slopes	1,431	0.1
158A	Ethridge-Verson clay loams, 0 to 2 percent slopes	1,886	0.2
167D	Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes	7,423	0.6
167E	Yawdim-Orinoco silty clay loams, 15 to 35 percent slopes	2,430	0.2
181D	Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes	5,316	0.4
181E	Cabbart-Crago-Delpoint complex, 15 to 35 percent slopes	9,463	0.8
189C	Rentsac-Cabbart complex, 2 to 15 percent slopes	3,192	0.3
189E	Rentsac-Rock outcrop complex, 15 to 45 percent slopes	1,965	0.2
230C	Macar loam, 2 to 8 percent slopes	5,853	0.5
232E	Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes	910	*
234F	Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes	131	*
240E	Ridge-Dast-Rock outcrop complex, 4 to 35 percent slopes	8,358	0.7
241E	Twilight-Blacksheep-Rock outcrop complex, 4 to 35 percent slopes	9,325	0.8
242D	Dast-Ridge sandy loams, 2 to 8 percent slopes	3,842	0.3
242F	Ridge-Dast sandy loams, 8 to 45 percent slopes	13,546	1.1
243F	Blacksheep-Twilight sandy loams, 8 to 45 percent slopes	10,867	0.9
245C	Lamedeer-Ringling channery loams, 2 to 8 percent slopes	817	*
245F	Lamedeer-Ringling channery loams, 4 to 45 percent slopes	1,256	0.1
246F	Lamedeer-Ringling channery loams, moist, 4 to 45 percent slopes	2,107	0.2
250E	Macmeal-Rock outcrop complex, 4 to 35 percent slopes	543	*
251C	Savage loam, 2 to 8 percent slopes	61	*
252D	Hilger-Rock outcrop complex, 4 to 35 percent slopes	385	*
252E	Hilger stony loam, 4 to 25 percent slopes	582	*
254C	Fergus clay loam, 2 to 8 percent slopes	593	*
255C	Shambo-Korchea-Barvon loams, 2 to 8 percent slopes	12,214	1.0
255D	Barvon-Cabba-Shambo loams, 4 to 15 percent slopes	6,939	0.6
256C	Yamacall-Havre-Delpoint loams, 2 to 8 percent slopes	15,258	1.3
260F	Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes	79	*
261F	Wayden-Castner complex, 8 to 45 percent slopes	745	*
262E	Wayden-Windham complex, 4 to 25 percent slopes	96	*
280D	Cabbart, moist-Delpoint, dry loams, 4 to 15 percent slopes	29,922	2.5
280E	Castner-Kuro complex, 4 to 25 percent slopes	466	*
281D	Doney-Cabba-Macar loams, 4 to 15 percent slopes	17,193	1.4
281E	Castner-Rock outcrop complex, 8 to 45 percent slopes	339	*
282D	Castner channery loam, 4 to 25 percent slopes	2,078	0.2
283D	Barvon-Cabba loams, 2 to 8 percent slopes	11,046	0.9
283F	Cabba-Rock outcrop complex, 8 to 45 percent slopes	28,372	2.4
284D	Cabba-Barvon loams, 4 to 15 percent slopes	17,944	1.5
284F	Doney-Wayden complex, 15 to 60 percent slopes	186	*
285D	Cabba-Doney loams, 4 to 15 percent slopes	14,472	1.2
285F	Cabba-Doney loams, 8 to 45 percent slopes	37,818	3.2
286F	Cabbart-Rock outcrop complex, 8 to 45 percent slopes	27,341	2.3
287D	Delpoint, dry-Cabbart, moist loams, 2 to 8 percent slopes	11,169	0.9
287F	Cabbart, moist-Delpoint, dry loams, 8 to 45 percent slopes	33,649	2.8
288D	Delpoint-Cabbart-Havre loams, 4 to 25 percent slopes	5,740	0.5
288F	Cabbart-Delpoint loams, 15 to 65 percent slopes	21,969	1.8

* See footnote at end of table

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
289D	Barvon-Cabba-Korchea loams, 3 to 25 percent slopes	9,627	0.8
289F	Cabba-Barvon loams, 15 to 65 percent slopes	75,019	6.3
291C	Windham very stony loam, 2 to 15 percent slopes	1,960	0.2
292A	Straw-Korchea loams, 0 to 2 percent slopes	5,329	0.4
294C	Shambo loam, 2 to 8 percent slopes	2,298	0.2
295F	Bitton-Winifred-Castner complex, 15 to 60 percent slopes	530	*
296D	Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes	1,039	*
DA	Denied access	17,129	1.4
UL	Urban land	455	*
W	Water	2,300	0.2
	Total	1,197,200	100.0

* Less than 0.1 percent.

Soil Series and Detailed Soil Map Units

In this section, arranged in alphabetical order, each series is described that has a component included in a map unit name. The detailed soil map units associated with the series follow, organized by the first named map unit component.

Characteristics of the soil and the material in which it formed are identified for each soil series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual." Many of the technical terms used in the descriptions are defined in "Soil Taxonomy." Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units on the detailed soil maps in Part III of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given in Part II of this survey.

A map unit delineation on the detailed soil maps represents an area on the landscape and consists of one or more soils or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, are mapped without areas of minor components of other taxonomic classes. Consequently, map units are made up of the soils or miscellaneous areas for which they are named and some areas of minor components that belong to other taxonomic classes.

Minor components have properties and behavioral characteristics divergent enough to affect use or to require different management. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Harlake silty clay, occasionally flooded, 0 to 2 percent slopes, is a phase of the Harlake series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Yamacall-Busby complex, 2 to 8 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop, is an example.

The table "Acreage and Proportionate Extent of the Soils" in Parts I and II of the manuscript gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Abor Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Sedimentary plains and hills
Parent material: Residuum or locally transported material weathered from shale
Slope range: 1 to 35 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Leptic Udic Haplusterts

Typical Pedon

Abor silty clay, in an area of Abor-Crago complex, 2 to 15 percent slopes, 2,100 feet south and 1,800 feet east of the northwest corner of sec 2, T. 11 N., R. 26 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong fine granular structure; hard, friable, sticky and plastic; many fine and very fine roots; moderately alkaline; gradual smooth boundary.

Bss—3 to 15 inches; light brownish gray (2.5Y 6/2) silty clay, dark brown (2.5Y 4/2) moist; strong medium blocky structure; very hard, friable, sticky and plastic; common fine and very fine roots; common slickensides on faces of peds; slightly effervescent; moderately alkaline; clear smooth boundary.

Bssk—15 to 27 inches; light brownish gray (2.5Y 6/2) silty clay, dark brown (2.5Y 4/2) moist; common fine and medium subangular blocky structure; extremely hard, friable, sticky and plastic; common fine and very fine roots; common slickensides on faces of peds; violently effervescent; moderately alkaline; clear smooth boundary.

Bky—27 to 32 inches; pale yellow (2.5Y 7/4) silty clay, dark brown (2.5Y 4/2) moist; common fine and medium subangular blocky structure; extremely hard, friable, sticky and plastic; few fine and very fine roots; few shale chips; strongly effervescent; strongly alkaline; abrupt smooth boundary.

Cr—32 to 60 inches; light gray (2.5Y 7/2) semiconsolidated sedimentary beds; light brownish gray (2.5Y 6/2) moist; massive; strongly alkaline.

Range in Characteristics

Soil Temperature: 42 to 47 degrees F with summer temperatures of 60 to 72 degrees F
Moisture control section: between 4 and 12 inches, dry in all parts between four tenths and five tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees or higher.
Depth to Bk horizon: 10 to 20 inches
Depth to bedrock: 20 to 40 inches, but mainly 25 to 35 inches
Note: These soils have cracks which extend to the paralithic contact and are as wide as 1/4 inch to 3 inches at the surface and are open for 150 days or less.

A horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 1, 2, 3, or 4 (The 1 chroma are inherent from the parent material.)
Clay content: 40 to 55 percent
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 7.4 to 8.4

Bss horizon

Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 1, 2, 3, or 4
Texture: silty clay, silty clay loam, or clay
Clay content: 35 to 60 percent
Rock fragments: 0 to 15 percent—0 to 3 percent greater than 3 inches cobbles and stones, 0 to 12 percent less than 3 inches pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 9.0
Slickensides: few to common

Bssk horizon

Hue: 2.5Y, 5Y, 2.5YR, or 10YR
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 1, 2, 3, or 4
Texture: silty clay, silty clay loam, clay loam, or clay
Clay content: 35 to 60 percent
Slickensides: few to common
Rock fragments: 0 to 20 percent—0 to 5 percent cobbles and stones; 0 to 15 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 9.0

Bky horizon

Hue: 2.5Y, 5Y, 10YR, or 2.5YR
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 1, 2, 3, or 4
Texture: silty clay, silty clay loam, or clay
Clay content: 35 to 60 percent
Rock fragments: 0 to 20 percent—0 to 5 percent cobbles and stones; 0 to 15 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Gypsum: 1 to 5 percent
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 9.0

60B—Abor silty clay, 1 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 1 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Abor and similar soils: 85 percent

Minor Components

Neldore and similar soils: 0 to 5 percent
Neldore, saline soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

74E—Abor-Crago complex, 15 to 35 percent slopes

Setting

Landform:
Abor—Hills
Crago—Relict stream terraces
Position on landform:
Abor—Backslopes
Crago—Shoulders and summits
Slope:
Abor—15 to 35 percent
Crago—15 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Abor and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Verson and similar soils: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.1 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

74D—Abor-Crago complex, 2 to 15 percent slopes

Setting

Landform:
Abor—Hills
Crago—Relict stream terraces
Position on landform:
Abor—Backslopes
Crago—Shoulders and summits
Slope:
Abor—2 to 15 percent
Crago—2 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Abor and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Verson and similar soils: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent

Major Component Description

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

60C—Abor-Neldore silty clays, 2 to 8 percent slopes

Setting

Landform:
Abor—Sedimentary plains
Neldore—Sedimentary plains
Position on landform:
Abor—Backslopes, footslopes, and side slopes
Neldore—Shoulders and summits

Slope:
Abor—2 to 8 percent
Neldore—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Abor and similar soils: 50 percent
Neldore and similar soils: 40 percent

Minor Components

Neldore, saline soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent

Major Component Description

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Absher Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Moderately well drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Torrertic Natrustalfs

Typical Pedon

Absher silty clay, in an area of Nobe-Absher complex, 0 to 4 percent slopes, 1,200 feet east and 300 feet north of the southwest corner of sec. 15, T. 9 N, R. 24 E.

E—0 to 1 inches; light brownish gray (10YR 6/2) silty clay, dark grayish brown (10YR 4/2) moist; moderate thin platy structure parting to strong fine and medium granular; slightly hard, friable, sticky and plastic; many very fine roots; moderately alkaline; abrupt smooth boundary

Btn—1 to 6 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; moderate medium columnar structure parting to strong fine and medium subangular blocky; extremely hard, firm, very sticky and very plastic; many very fine roots; continuous distinct clay films on faces of peds; moderately alkaline; clear smooth boundary.

Btkn—6 to 14 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; strong fine and medium subangular blocky structure; extremely hard, firm, very sticky and very plastic; common very fine roots; continuous distinct clay films on faces of peds; few fine and medium masses of lime; slightly effervescent; strongly alkaline; clear smooth boundary.

Bknyz1—14 to 30 inches; brown (10YR 5/3) silty clay, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; hard, friable, very sticky and very plastic; few fine and very fine roots; common fine crystals of gypsum; common fine crystals of salt; common fine and medium masses of lime; slightly effervescent; moderately alkaline; clear smooth boundary.

Bknyz2—30 to 60 inches; brown (10YR 5/3) silty clay, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; hard, friable, very sticky and very plastic; few fine roots; common very fine crystals of gypsum; common very fine crystals of salt; few fine and medium threads of lime; slightly effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F (60 to 68 degrees, summer).

Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher

E horizon

Hue: 2.5Y, 10YR, or 7.5YR
Value: 6 or 7 dry; 3, 4, or 5 moist
Chroma: 1, 2, or 3
Clay content: 40 to 55 percent
Electrical conductivity: 4 to 8 mmhos/cm
Reaction: pH 6.6 to 8.4

Btn horizon

Hue: 2.5Y, 7.5YR, or 10YR
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 1, 2, or 3
Texture: silty clay, clay, or clay loam
Clay content: 35 to 60 percent
Structure: moderate or strong columnar or prismatic
Consistence: very hard or extremely hard when dry
Rock fragments: 0 to 15 percent pebbles
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 18 to 70
Reaction: pH 6.6 to 8.4

Btkn horizon

Hue: 2.5Y, 10YR, or 7.5YR
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay loam, clay, or silty clay
Clay content: 35 to 50 percent
Rock fragments: 0 to 15 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 16 to 32 mmhos/cm
Sodium adsorption ratio: 18 to 70
Gypsum: 1 to 5 percent
Reaction: pH 7.9 to 9.6

Bknyz horizons

Hue: 2.5Y, 10YR, or 7.5YR
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay loam, silty clay, or clay
Clay content: 35 to 50 percent
Rock fragments: 0 to 15 percent pebbles
Calcium carbonate equivalent: 4 to 15 percent
Electrical conductivity: 16 to 32 mmhos/cm
Sodium adsorption ratio: 18 to 70
Gypsum: 1 to 5 percent
Reaction: pH 7.9 to 9.6

Attewan Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) above the 2C horizon, rapid (6.0 to 20.0 inches/hour) in the 2C horizon
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aridic Argiborolls

Typical Pedon

Attewan loam, in an area of Eapa-Attewan loams, 0 to 2 percent slopes, 100 feet north and 200 feet west of the southeast corner of sec. 1, T. 9 N., R. 22 E.

A—0 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, sticky and plastic; many fine and very fine and few coarse roots; moderately alkaline; clear smooth boundary.

Bt1—5 to 9 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; moderate medium blocky structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; many fine and very fine and few coarse roots; common distinct clay films on faces of peds and lining pores; moderately alkaline; clear smooth boundary.

Bt2—9 to 14 inches; pale brown (10YR 6/3) clay loam, dark brown (10 YR 3/3) moist; weak fine prismatic structure parting to moderate medium subangular blocky; hard, very firm, sticky and plastic; many fine and very fine and common coarse roots; common distinct clay films on faces of peds and lining pores; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk1—14 to 20 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, very firm, slightly sticky and plastic; many fine and very fine roots; few medium irregular masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bk2—20 to 26 inches; pale yellow (2.5Y 7/4) gravelly loam, light olive brown (2.5Y 5/4) moist; weak coarse subangular blocky structure; hard, very firm, sticky and plastic; common fine roots; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

2C—26 to 60 inches; pale yellow (2.5Y 7/4) very gravelly loamy sand, light olive brown (2.5Y 5/4) moist; massive; loose, very friable, nonsticky and nonplastic; few fine roots; 60 percent pebbles; disseminated lime; common distinct lime crusts on underside of pebbles; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in some part six-tenths or more of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher
Mollic epipedon thickness: 7 to 12 inches and may include part or all of the argillic horizon
Depth to Bk horizon: 10 to 21 inches
Depth to 2C horizon: 20 to 40 inches

A horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 10 to 20 percent
Rock fragments: 0 to 35 percent—0 to 10 percent stones and cobbles; 0 to 25 percent pebbles
Reaction: pH 6.6 to 8.4

Bt horizons
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 3 or 4 moist
Chroma: 2 or 3
Texture: clay loam, sandy clay loam, or loam
Clay content: 20 to 35 percent
Rock fragments: 0 to 25 percent—0 to 5 percent stones and cobbles; 0 to 20 percent pebbles
Reaction: pH 6.6 to 8.4

Bk1 and Bk2 horizons
Hue: 10YR or 2.5Y
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, 4, or 6
Texture: loam, clay loam, sandy clay loam, or sandy loam
Clay content: 15 to 30 percent
Rock fragments: 0 to 30 percent—0 to 5 percent stones and cobbles; 0 to 25 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

2C horizon
Hue: 2.5Y or 10YR
Value: 4, 5, 6 or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loamy sand or sand
Clay content: 0 to 10 percent
Rock fragments: 35 to 75 percent—0 to 15 percent stones and cobbles; 35 to 60 percent pebbles
Calcium carbonate equivalent: 1 to 15 percent
Reaction: pH 7.4 to 8.4

57B—Attewan cobbly loam, 0 to 4 percent slopes

Setting

Landform: Relict stream terraces
Slope: 0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Attewan and similar soils: 85 percent

Minor Components

Crago and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

57A—Attewan loam, 0 to 4 percent slopes

Setting

Landform: Relict stream terraces
Slope: 0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Attewan and similar soils: 85 percent

Minor Components

Crago and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

57C—Attewan-Niart loams, 0 to 4 percent slopes

Setting

Landform:
  Attewan—Relict stream terraces
  Niart—Relict stream terraces
Slope:
  Attewan—0 to 4 percent
  Niart—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Attewan and similar soils: 45 percent
Niart and similar soils: 40 percent

Minor Components

Verson and similar soils: 0 to 5 percent
Crago and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent

Major Component Description

Attewan

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Niart

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

1E—Badland

Composition

Major Components

Badland: 85 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Definition: Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Geologic erosion is active.

Barvon Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated sedimentary beds
Slope range: 2 to 35 percent
Elevation range: 3,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive Entic Haploborolls

Typical Pedon

Barvon loam, in an area of Cabba-Barvon loams, 15 to 65 percent slopes, 300 feet east and 450 feet north of the southwest corner of sec. 25, T. 8 N., R. 28 E.

A1—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.

A2—6 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and medium roots, neutral; clear smooth boundary.

Bk1—10 to 22 inches; light gray (2.5Y 7/2) clay loam, grayish brown (2.5Y 5/2) moist; weak medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—22 to 29 inches; light gray (2.5Y 7/2) clay loam, light brownish gray (2.5Y 6/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cr—29 to 60 inches; semiconsolidated sedimentary beds.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Mollic epipedon thickness: 7 to 16 inches
Depth to bedrock: 20 to 40 inches
Depth to K horizon: 7 to 16 inches

A horizons
Hue: 10YR
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.6 to 7.8

Bk1 and Bk2 horizons
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: less than 2 mm: loam or clay loam
Clay content: 20 to 30 percent
Rock fragments: 0 to 10 percent flat angular pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Cr horizon
Note: semiconsolidated sandy or silty sedimentary beds or semiconsolidated shale that texture to loamy fine sand to light silty clay

283D—Barvon-Cabba loams, 2 to 8 percent slopes

Setting

Landform:
Barvon—Sedimentary plains
Cabba—Sedimentary plains
Position on landform:
Barvon—Backslopes, footslopes, and side slopes
Cabba—Shoulders and summits
Slope:
Barvon—2 to 8 percent
Cabba—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Barvon and similar soils: 45 percent
Cabba and similar soils: 40 percent

Minor Components

Doney and similar soils: 0 to 5 percent
Dast and similar soils: 0 to 5 percent
Macar and similar soils: 0 to 5 percent

Major Component Description

Barvon

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

289D—Barvon-Cabba-Korchea loams, 3 to 25 percent slopes

Setting

Landform:
  Barvon—Sedimentary plains and hills
  Cabba—Hills
  Korchea—Flood plains
Position on landform:
  Barvon—Backslopes, footslopes, and side slopes
  Cabba—Shoulders and summits
  Korchea—Drainageways
Slope:
  Barvon—3 to 25 percent
  Cabba—8 to 25 percent
  Korchea—3 to 4 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Barvon and similar soils: 35 percent
Cabba and similar soils: 25 percent
Korchea and similar soils: 20 percent

Minor Components

Shambo and similar soils: 0 to 5 percent
Macar and similar soils: 0 to 10 percent
Doney and similar soils: 0 to 5 percent

Major Component Description

Barvon

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.0 inches

Korchea

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 10.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

255D—Barvon-Cabba-Shambo loams, 4 to 15 percent slopes

Setting

Landform:
  Barvon—Sedimentary plains
  Cabba—Hills
  Shambo—Alluvial fans and stream terraces
Position on landform:
  Barvon—Backslopes, footslopes, and side slopes
  Cabba—Shoulders and summits
  Shambo—Footslopes
Slope:
  Barvon—4 to 8 percent
  Cabba—8 to 15 percent
  Shambo—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Barvon and similar soils: 35 percent
Cabba and similar soils: 30 percent
Shambo and similar soils: 30 percent

Minor Components

Korchea and similar soils: 0 to 5 percent

Major Component Description

Barvon

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

Shambo

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Binna Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate in the upper 25 inches (0.6 to 2.0 inches/hour); below this depth rapid (6.0 to 20.0 inches/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aridic Calciborolls

Typical Pedon

Binna loam, 0 to 4 percent slopes, 2,400 feet west and 2,500 feet south of the northeast corner of sec. 6, T. 9 N., R. 25 E.

Ap—0 to 6 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 5 percent pebbles; few faint lime coatings on pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk1—6 to 13 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 5 percent pebbles; common distinct lime coatings on pebbles; disseminated lime; many fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—13 to 25 inches; very pale brown (10YR 7/3) gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine matted roots; 25 percent pebbles; common distinct lime cast on pebbles; disseminated lime; many very fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

2C—25 to 60 inches; brownish yellow (10YR 6/6) very gravelly loamy sand, yellowish brown (10YR 5/6) moist; massive; loose, nonsticky and nonplastic; 5 percent cobbles, 50 percent pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 10 inches
Depth to sandy-skeletal horizon: 20 to 40 inches

Ap horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry (value dry is 5 when mixed to 7 inches)
Chroma: 2 or 3
Clay content: 15 to 27 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.4 to 8.4

Bk1 and Bk2 horizons
Hue: 10YR or 2.5Y
Value: 7 or 8 dry; 5 or 6 moist
Chroma: 2 or 3
Clay content: 18 to 27 percent
Rock fragments: 0 to 35 percent—0 to 10 percent cobbles, 0 to 25 percent pebbles
Calcium carbonate equivalent: 15 to 30 percent
Reaction: pH 7.9 to 9.0

2C horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry; 5 or 6 moist
Chroma: 2 or 3
Texture: sand or loamy sand
Clay content: 0 to 10 percent
Rock fragments: 35 to 80 percent—5 to 15 percent cobbles, 30 to 65 percent pebbles
Calcium carbonate equivalent: 5 to 20 percent
Reaction: pH 7.9 to 9.0

92A—Binna loam, 0 to 4 percent slopes

Setting

Landform: Relict stream terraces
Slope: 0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Binna and similar soils: 85 percent

Minor Components

Rothiemay and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Bitton Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Hills
Parent material: Alluvium or colluvium

Slope range: 15 to 60 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost free period: 90 to 125 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Typic Haploborolls

Typical Pedon

Bitton gravelly loam, in an area of Bitton-Winifred-Castner complex, 15 to 60 percent slopes, 2,600 feet west and 800 feet south of the northeast corner of sec. 5, T. 11 N., R. 23 E.

A—0 to 8 inches; dark brown (10YR 4/3) gravelly loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 15 percent pebbles; slightly alkaline; clear smooth boundary.

Bw—8 to 15 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 30 percent pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk1—15 to 35 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; 30 percent pebbles; common distinct lime casts on undersides of pebbles; common fine and medium masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—35 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; 70 percent pebbles; common distinct lime casts on undersides of pebbles; disseminated lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 15 inches
Depth to Bk horizon: 11 to 28 inches

A horizon
Hue: 10YR, 2.5Y, 7.5YR, or 5YR
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 15 to 27 percent
Rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent pebbles
Reaction: pH 6.6 to 8.4

Bw horizon
Hue: 10YR, 2.5Y, 7.5YR, or 5YR
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Clay content: 15 to 27 percent
Rock fragments: 20 to 60 percent—0 to 10 percent stones and cobbles; 20 to 60 percent channers and pebbles
Reaction: pH 7.4 to 8.4

Bk horizons
Hue: 10YR, 2.5Y, 7.5YR, or 5YR
Value: 5, 6, 7, or 8 dry; 5, 6, 7, or 8 moist
Chroma: 3 or 4
Texture: loam or sandy loam
Clay content: 10 to 27 percent
Rock fragments: 35 to 75 percent—0 to 60 percent cobbles and stones; 35 to 60 percent pebbles and channers
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

295F—Bitton-Winifred-Castner complex, 15 to 60 percent slopes

Setting

Landform:
Bitton—Hills
Winifred—Hills
Castner—Hills
Position on landform:
Bitton—Backslopes, footslopes, and side slopes
Winifred—Backslopes
Castner—Shoulders and summits
Slope:
Bitton—15 to 60 percent
Winifred—15 to 45 percent
Castner—15 to 60 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Bitton and similar soils: 40 percent
Winifred and similar soils: 30 percent
Castner and similar soils: 25 percent

Minor Components

Kuro and similar soils: 0 to 5 percent

Major Component Description

Bitton

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.1 inches

Winifred

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Castner

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Blacksheep Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated sandy sedimentary beds
Slope range: 2 to 45 percent
Elevation range: 2,710 to 4,600 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents

Typical Pedon

Blacksheep sandy loam, in an area of Twilight-Blacksheep sandy loams, 2 to 8 percent slopes, 2,400 feet north and 1,800 feet west of the southeast corner of sec. 23, T. 9 N., R. 27 E.

A—0 to 4 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; common medium and fine roots; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk—4 to 18 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; violently effervescent; moderately alkaline; clear smooth boundary.

Cr—18 to 60 inches; semiconsolidated sandy sedimentary beds.

Range in Characteristics

Soil temperature: 44 to 47 degrees F
Moisture control section: between 8 inches and the paralithic contact; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 5 degrees F or higher

A horizon
Hue: 2.5Y, 7.5YR, or 10YR
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: fine sandy loam or sandy loam
Clay content: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Bk horizon
Hue: 2.5Y, 7.5YR, or 10YR
Value: 5, 6, or 7 dry; 5 or 6 moist
Chroma: 2 or 3
Texture: very fine sandy loam, fine sandy loam, or sandy loam

Clay content: 5 to 15 percent
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 8.4

80E—Blacksheep-Rock outcrop-Twilight complex, 8 to 45 percent slopes

Setting

Landform:
Blacksheep—Hills
Twilight—Hills
Position on landform:
Blacksheep—Backslopes and side slopes
Rock outcrop—Shoulders and summits
Twilight—Backslopes, footslopes, and side slopes
Slope:
Blacksheep—8 to 45 percent
Twilight—8 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Blacksheep and similar soils: 40 percent
Rock outcrop: 25 percent
Twilight and similar soils: 25 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Blacksheep

Surface layer texture: Sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.6 inches

Rock outcrop

Definition: Areas of exposed hard sandstone

Twilight

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

243F—Blacksheep-Twilight sandy loams, 8 to 45 percent slopes

Setting

Landform:
Blacksheep—Hills
Twilight—Hills
Position on landform:
Blacksheep—Backslopes and side slopes
Twilight—Backslopes, footslopes, and side slopes
Slope:
Blacksheep—15 to 45 percent
Twilight—8 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Blacksheep and similar soils: 45 percent
Twilight and similar soils: 40 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Blacksheep

Surface layer texture: Sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.6 inches

Twilight

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Borky Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Hills and sedimentary plains
Parent material: Semiconsolidated shale residuum
Slope range: 2 to 15 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey-skeletal, mixed, superactive Typic Argiborolls

Typical Pedon

Borky very stony clay loam, in an area of Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes, 700 feet west and 1,800 feet south of the northeast corner of sec. 7, T. 11 N., R. 22 E.

A—0 to 3 inches; dark brown (10YR 4/3) very stony loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 20 percent stones and cobbles, 15 percent pebbles; neutral; clear wavy boundary.

Bt—3 to 11 inches; brown (10YR 4/3) very stony clay loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; hard, firm, sticky and very plastic; many fine and very fine roots; many distinct clay films on faces of peds; 25 percent stones, 15 percent pebbles; neutral; clear wavy boundary.

Bk1—11 to 21 inches; light brownish gray (10YR 6/2) very stony clay loam, grayish brown (10YR 5/2) moist; moderate fine and very fine subangular blocky structure; hard, friable, sticky and plastic; common fine roots; 30 percent stones, 20 percent pebbles; many fine irregular masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—21 to 33 inches; light brownish gray (10YR 6/2) very stony clay loam, grayish brown (10YR 5/2) moist; moderate fine and very fine subangular blocky structure; hard, friable, sticky and plastic; common fine roots; 25 percent stones, 20 percent pebbles; many medium irregular masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cr—33 to 60 inches; semiconsolidated shale interbedded with sandstone.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 14 inches
Depth to Bk horizon: 11 to 20 inches
Depth to Cr horizon: 20 to 40 inches

A horizon
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 15 to 60 percent—0 to 30 percent flagstones, stones, or cobbles; 15 to 30 percent pebbles or channers
Reaction: pH 6.6 to 7.8

Bt horizon
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2 or 3
Texture: clay or clay loam
Clay content: 35 to 50 percent
Rock fragments: 35 to 60 percent—20 to 40 percent flagstones, stones, and cobbles; 15 to 30 percent pebbles or channers
Reaction: pH 6.6 to 7.8

Bk horizons
Hue: 10YR or 2.5Y
Value: 6, 7, or 8 dry; 5, 6, or 7 moist
Chroma: 2, 3, or 4
Texture: clay loam, clay, silty clay loam, or silty clay
Clay content: 35 to 45 percent

Rock fragments: 35 to 60 percent—20 to 40 percent stones and cobbles; 15 to 30 percent pebbles or channers
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

296D—Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes

Setting

Landform:
  Borky—Sedimentary plains and hills
  Sinnigam—Hills and bedrock floored plains
Position on landform:
  Borky—Backslopes
  Sinnigam—Shoulders and summits
Slope:
  Borky—2 to 15 percent
  Sinnigam—2 to 15 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Borky and similar soils: 50 percent
Sinnigam and similar soils: 40 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Delplain and similar soils: 0 to 5 percent

Major Component Description

Borky

Surface layer texture: Very stony loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.6 inches

Sinnigam

Surface layer texture: Very stony clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Bullhook Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents

Typical Pedon

Bullhook loam in an area of Lostriver-Bullhook complex, 0 to 2 percent slopes, 100 feet east and 1,700 feet south of the northwest corner of sec. 18, T. 7 N., R. 25 E.

A—0 to 5 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; strongly effervescent; moderately alkaline; gradual wavy boundary.

C—5 to 11 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, sticky and plastic; many fine and very fine roots; strongly effervescent; strongly alkaline; clear smooth boundary.

Cyz—11 to 60 inches; light brownish gray (2.5Y 6/2) clay loam with thin strata of loam and fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, sticky and plastic; few very fine roots; many fine and very fine irregular masses of gypsum and other salts; strongly effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or above

A horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Clay content: 15 to 27 percent
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 8 to 13
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 7.4 to 9.4

C horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay loam, loam, or silty clay loam with or without thin layers of loam, clay, silty clay loam, fine sandy loam, or silt loam
Clay content: 18 to 35 percent
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 20
Calcium carbonate equivalent: 5 to 10
Reaction: pH 7.4 to 9.6

Cyz horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay loam, loam, or silty clay loam with or without thin layers of fine sandy loam, loam, clay loam, silty clay loam, or silt loam
Clay content: 18 to 35 percent
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 30
Gypsum: 2 to 5 percent
Calcium carbonate equivalent: 5 to 10
Reaction: pH 7.4 to 9.6

Busby Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Sedimentary plains and hills
Parent material: Alluvium
Slope range: 2 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Coarse-loamy, mixed, superactive, frigid Aridic Ustochrepts

Typical Pedon

Busby fine sandy loam, 8 to 15 percent slopes 3,875 feet south and 250 feet east of the northwest corner of sec. 1, T. 8 N., R 30 E.

A—0 to 6 inches; grayish brown (10YR 5/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; moderately alkaline; clear smooth boundary.

Bw—6 to 13 inches; brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to weak fine subangular blocky; slightly hard, friable, nonsticky and nonplastic; many very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk1—13 to 24 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine roots; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bk2—24 to 43 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few fine roots; few fine masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.

BC—43 to 60 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 8 and 24 inches; dry in all parts between four-tenths and five-tenths of the cumulative days when the soil temperature at 20 inches is 41 degrees F or above
Depth to Bk horizon: 10 to 20 inches

A horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Clay content: 10 to 18 percent
Reaction: pH 7.4 to 8.4

Bw horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: fine sandy loam, sandy loam, or loam
Clay content: 10 to 18 percent
Reaction: pH 7.4 to 8.4
Effervescence: none to strongly

Bk horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Textures: fine sandy loam or sandy loam
Clay content: 10 to 18 percent
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 8.4

BC horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry; 5 or 6 moist
Chroma: 2, 3, or 4
Texture: fine sandy loam, sandy loam, loamy fine sand, loamy sand, or fine sand (The loamy fine sand, loamy sand, or fine sand textures are below depths of 40 inches.)
Clay content: 3 to 18 percent
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 8.4

30C—Busby fine sandy loam, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Busby and similar soils: 85 percent

Minor Components

Chinook and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

30D—Busby fine sandy loam, 8 to 15 percent slopes

Setting

Landform: Hills
Slope: 8 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Busby and similar soils: 85 percent

Minor Components

Twilight and similar soils: 0 to 5 percent
Chinook and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

130B—Busby-Twilight complex, 2 to 8 percent slopes

Setting

Landform: Fans and uplands
Slope: 2 to 8 percent
Elevation: 2,000 to 5,500 feet
Mean annual precipitation: 12 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Busby and similar soils: 45 percent
Twilight and similar soils: 40 percent

Minor Components

Blackhall and similar soils: 15 percent

Major Component Description

Busby

Surface layer texture: Fine sandy loam
Depth class: Deep (40 inches or more)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.3 inches

Twilight

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Cabba Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Hills and sedimentary plains
Parent material: Semiconsolidated sedimentary beds
Slope range: 4 to 65 percent
Elevation range: 3,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy, mixed, calcareous, superactive, frigid, shallow Typic Ustorthents

Typical Pedon

Cabba loam, in an area of Cabba-Doney loams, 8 to 45 percent slopes, 2,400 east and 1,200 feet north of the southwest corner of sec. 4, T. 6 N., R. 27 E.

A—0 to 3 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate very fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk1—3 to 7 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; few fine masses of lime; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk2—7 to 17 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very roots; few fine masses of lime; slightly effervescent; moderately alkaline; clear wavy boundary.

Cr—17 to 60 inches; semiconsolidated sedimentary beds.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches or to the paralithic contact. Frozen November through March; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees or higher
Depth to Cr horizon: 10 to 20 inches
Notes: The chromas of 1 are lithochromic.

A horizon
Hue: 10YR or 2.5Y
Value: 3, 4, 5, or 6 dry; 3 or 4 moist
Chroma: 1, 2, 3, or 4
Clay content: 10 to 27 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 9.0

Bk horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist
Chroma; 1, 2, 3, 4, or 6
Texture: loam, silt loam, clay loam, or silty clay loam
Clay content: 20 to 35 percent
Rock fragments: 0 to 35 percent—0 to 5 percent cobbles, 0 to 30 percent pebbles or channers
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 2 to 8 mmhos/cm
Reaction: pH 7.4 to 9.0

289F—Cabba-Barvon loams, 15 to 65 percent slopes

Setting

Landform:
Cabba—Hills
Barvon—Hills
Position on landform:
Cabba—Backslopes and side slopes
Barvon—Backslopes, footslopes, and side slopes
Slope:
Cabba—25 to 65 percent
Barvon—15 to 35 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabba and similar soils: 45 percent
Barvon and similar soils: 40 percent

Minor Components

Doney and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.0 inches

Barvon

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

284D—Cabba-Barvon loams, 4 to 15 percent slopes

Setting

Landform:
Cabba—Sedimentary plains and hills
Barvon—Sedimentary plains
Position on landform:
Cabba—Backslopes and side slopes
Barvon—Backslopes, footslopes, and side slopes

Slope:
Cabba—8 to 15 percent
Barvon—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabba and similar soils: 45 percent
Barvon and similar soils: 40 percent

Minor Components

Doney and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent
Dast and similar soils: 0 to 5 percent

Major Component Description

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

Barvon

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

285D—Cabba-Doney loams, 4 to 15 percent slopes

Setting

Landform:
Cabba—Hills
Doney—Sedimentary plains
Position on landform:
Cabba—Backslopes and side slopes
Doney—Backslopes, footslopes, and side slopes
Slope:
Cabba—8 to 15 percent
Doney—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Cabba and similar soils: 45 percent
Doney and similar soils: 40 percent

Minor Components

Barvon and similar soils: 0 to 5 percent
Macar and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent

Major Component Description

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

Doney

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

285F—Cabba-Doney loams, 8 to 45 percent slopes

Setting

Landform:
  Cabba—Hills
  Doney—Hills
Position on landform:
  Cabba—Backslopes and side slopes
  Doney—Backslopes, footslopes, and side slopes
Slope:
  Cabba—15 to 45 percent
  Doney—8 to 35 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Cabba and similar soils: 45 percent
Doney and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Barvon and similar soils: 0 to 5 percent
Ridge and similar soils: 0 to 5 percent

Major Component Description

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

Doney

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

283F—Cabba-Rock outcrop complex, 8 to 45 percent slopes

Setting

Landform: Hills
Slope: 8 to 45 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabba and similar soils: 60 percent
Rock outcrop: 25 percent

Minor Components

Doney and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent
Ridge and similar soils: 0 to 5 percent

Major Component Description

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained

Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.0 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Cabbart Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated sedimentary beds
Slope range: 0 to 65 percent
Elevation range: 2,710 to 4,600 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents

Typical Pedon

Cabbart loam, in an area of Cabbart-Delpoint loams, 4 to 15 percent slopes, in cropland, 2,800 feet south and 50 feet east of the northwest corner of sec. 33, T. 11 N., R. 22 E.

Ap—0 to 4 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk—4 to 8 inches; very pale brown (10YR 7/4) loam, yellowish brown (10YR 5/4) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BC—8 to 16 inches; light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; hard, firm, slightly sticky and slightly plastic; few very fine roots; violently effervescent; moderately alkaline; diffuse wavy boundary.

Cr—16 to 60 inches; semiconsolidated sedimentary beds.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches or to the paralithic contact; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F
Depth to Cr horizon: 10 to 20 inches
Soil phases: moist; high ppt

A horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 18 to 27 percent
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 9.0

Bk and BC horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, silt loam, or silty clay loam
Clay content: 18 to 35 percent
Rock fragments: 0 to 45 percent—0 to 15 percent hard pebbles, 0 to 45 percent soft pebbles
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 1 to 10
Gypsum: 1 to 5 percent
Calcium carbonate equivalent: 15 to 25 percent
Reaction: pH 7.4 to 9.0

85A—Cabbart clay loam, 0 to 2 percent slopes

Setting

Landform: Sedimentary plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 85 percent

Minor Components

Rentsac and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

81D—Cabbart loam, 4 to 15 percent slopes

Setting

Landform: Sedimentary plains and hills
Slope: 4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 85 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

280D—Cabbart, moist-Delpoint, dry loams, 4 to 15 percent slopes

Setting

Landform:
Cabbart—Sedimentary plains and hills
Delpoint—Sedimentary plains
Position on landform:
Delpoint—Backslopes, footslopes, and side slopes
Slope:
Cabbart—4 to 15 percent
Delpoint—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 45 percent
Delpoint and similar soils: 40 percent

Minor Components

Twilight and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

287F—Cabbart, moist-Delpoint, dry loams, 8 to 45 percent slopes

Setting

Landform:
  Cabbart—Hills
  Delpoint—Hills
Position on landform:
  Cabbart—Backslopes and side slopes
  Delpoint—Backslopes, footslopes, and side slopes
Slope:
  Cabbart—25 to 45 percent
  Delpoint—8 to 35 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 45 percent
Delpoint and similar soils: 40 percent

Minor Components

Yawdim and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

181E—Cabbart-Crago-Delpoint complex, 15 to 35 percent slopes

Setting

Landform:
  Cabbart—Hills
  Crago—Relict stream terraces
  Delpoint—Hills
Position on landform:
  Cabbart—Backslopes and side slopes
  Crago—Shoulders and summits
  Delpoint—Backslopes, footslopes, and side slopes
Slope:
  Cabbart—15 to 35 percent
  Crago—15 to 35 percent
  Delpoint—15 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Crago and similar soils: 30 percent
Delpoint and similar soils: 25 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

181D—Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes

Setting

Landform:
Cabbart—Sedimentary plains and hills
Crago—Relict stream terraces
Delpoint—Sedimentary plains and hills
Position on landform:
Cabbart—Backslopes and side slopes
Crago—Shoulders and summits
Delpoint—Backslopes, footslopes, and side slopes
Slope:
Cabbart—4 to 15 percent
Crago—4 to 15 percent
Delpoint—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Crago and similar soils: 30 percent
Delpoint and similar soils: 25 percent

Minor Components

Yawdim and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

288F—Cabbart-Delpoint loams, 15 to 65 percent slopes

Setting

Landform:
  Cabbart—Hills
  Delpoint—Hills
Position on landform:
  Cabbart—Backslopes and side slopes
  Delpoint—Backslopes, footslopes, and side slopes
Slope:
  Cabbart—25 to 65 percent
  Delpoint—15 to 35 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 45 percent
Delpoint and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

82B—Cabbart-Delpoint loams, 4 to 15 percent slopes

Setting

Landform:
  Cabbart—Sedimentary plains and hills
  Delpoint—Sedimentary plains and hills
Position on landform:
  Cabbart—Shoulders and summits
  Delpoint—Backslopes, footslopes, and side slopes
Slope:
  Cabbart—4 to 15 percent
  Delpoint—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 45 percent
Delpoint and similar soils: 40 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

82C—Cabbart-Delpoint-Rock outcrop complex, 4 to 15 percent slopes

Setting

Landform:
  Cabbart—Sedimentary plains and hills
  Delpoint—Sedimentary plains and hills
Position on landform:
  Cabbart—Shoulders and summits
  Delpoint—Backslopes, footslopes, and side slopes
  Rock outcrop—Shoulders and summits
Slope:
  Cabbart—4 to 15 percent
  Delpoint—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Delpoint and similar soils: 30 percent
Rock outcrop: 25 percent

Minor Components

Yawdim and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

82E—Cabbart-Delpoint-Rock outcrop complex, 8 to 45 percent slopes

Setting

Landform:
  Cabbart—Hills
  Delpoint—Hills
Position on landform:
  Cabbart—Shoulders and summits
  Delpoint—Backslopes, footslopes, and side slopes
  Rock outcrop—Shoulders and summits
Slope:
  Cabbart—8 to 45 percent
  Delpoint—8 to 15 percent

Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Delpoint and similar soils: 30 percent
Rock outcrop: 25 percent

Minor Components

Blacksheep and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

154D—Cabbart-Marmarth complex, 4 to 15 percent slopes

Setting

Landform:
Cabbart—Sedimentary plains and hills
Marmarth—Sedimentary plains and hills
Position on landform:
Cabbart—Shoulders and summits
Marmarth—Backslopes, footslopes, and side slopes
Slope:
Cabbart—4 to 15 percent
Marmarth—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 45 percent
Marmarth and similar soils: 40 percent

Minor Components

Tanna and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Amherst and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Marmarth

Surface layer texture: Fine sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained

Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

86D—Cabbart-Rentsac complex, 2 to 15 percent slopes

Setting

Landform:
  Cabbart—Sedimentary plains and hills
  Rentsac—Sedimentary plains and hills
Slope:
  Cabbart—2 to 15 percent
  Rentsac—2 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 45 percent
Rentsac and similar soils: 40 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Rentsac

Surface layer texture: Fine sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

86E—Cabbart-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform: Hills
Slope: 4 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 60 percent
Rock outcrop: 25 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

286F—Cabbart-Rock outcrop complex, 8 to 45 percent slopes

Setting

Landform: Hills
Slope: 8 to 45 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 65 percent
Rock outcrop: 20 percent

Minor Components

Doney and similar soils: 0 to 5 percent
Ridge and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

83D—Cabbart-Rock outcrop-Blacksheep complex, 8 to 45 percent slopes

Setting

Landform:
Cabbart—Hills
Blacksheep—Hills
Slope:
Cabbart—8 to 45 percent
Blacksheep—8 to 45 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Rock outcrop: 30 percent
Blacksheep and similar soils: 25 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Rock outcrop

Definition: Areas of exposed bedrock

Blacksheep

Surface layer texture: Fine sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained

Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

153D—Cabbart-Tanna loams, 4 to 15 percent slopes

Setting

Landform:
Cabbart—Sedimentary plains and hills
Tanna—Sedimentary plains and hills
Position on landform:
Cabbart—Shoulders and summits
Tanna—Backslopes, footslopes, and side slopes
Slope:
Cabbart—4 to 15 percent
Tanna—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 45 percent
Tanna and similar soils: 40 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Megonot and similar soils: 0 to 5 percent
Welter and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Tanna

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

84E—Cabbart-Yawdim-Delpoint complex, 15 to 35 percent slopes

Setting

Landform:
Cabbart—Hills
Yawdim—Hills
Delpoint—Hills
Position on landform:
Cabbart—Shoulders and summits
Yawdim—Shoulders and summits
Delpoint—Backslopes, footslopes, and side slopes
Slope:
Cabbart—15 to 35 percent
Yawdim—15 to 35 percent
Delpoint—15 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Yawdim and similar soils: 30 percent
Delpoint and similar soils: 25 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

84C—Cabbart-Yawdim-Delpoint complex, 4 to 15 percent slopes

Setting

Landform:
Cabbart—Sedimentary plains and hills
Yawdim—Sedimentary plains and hills
Delpoint—Sedimentary plains and hills
Position on landform:
Cabbart—Shoulders and summits
Yawdim—Shoulders and summits
Delpoint—Backslopes, footslopes, and side slopes
Slope:
Cabbart—4 to 15 percent
Yawdim—4 to 15 percent
Delpoint—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Yawdim and similar soils: 30 percent
Delpoint and similar soils: 25 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.7 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

84D—Cabbart-Yawdim-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform:
  Cabbart—Hills
  Yawdim—Hills
Slope:
  Cabbart—4 to 35 percent
  Yawdim—4 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Cabbart and similar soils: 35 percent
Yawdim and similar soils: 30 percent
Rock outcrop: 25 percent

Minor Components

Blacksheep and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent

Major Component Description

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Castner Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to moderately rapid (2.0 to 6.0 inches/hour)
Landform: Hills and bedrock floored plains
Parent material: Sandstone residuum
Slope range: 4 to 60 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lithic Haploborolls

Typical Pedon

Castner channery loam, 4 to 25 percent slopes, 2,200 feet west and 2,100 feet south of the northeast corner of sec. 7, T. 11 N., R. 22 E.

A—0 to 2 inches; brown (10YR 4/3) channery loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; 20 percent channers; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—2 to 7 inches; brown (10YR 5/3) channery loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 5 percent flagstones, 30 percent channers; common distinct lime casts on the underside of coarse fragments; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk1—7 to 13 inches; pale brown (10YR 6/3) very channery loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; 10 percent flagstones, 50 percent channers; common distinct lime casts on coarse fragments; many large irregular masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk2—13 to 18 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; 60 percent channers, 10 percent flagstones; common distinct lime casts on undersides of channers and flagstones, disseminated lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

R—18 inches; layered shattered calcareous sandstone.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 15 inches
Depth to bedrock: 10 to 20 inches
Depth to k horizon: 7 to 15 inches

A horizon
Hue: 2.5Y, 10YR, 7.5YR, or 5YR
Value: 3, 4, or 5 dry; 2 or 3 moist
Chroma: 1, 2, or 3
Clay content: 10 to 18 percent with less than 35 percent fine and coarser sand
Rock fragments: 15 to 35 percent—0 to 10 percent cobbles and stones, 15 to 25 percent pebbles and channers
Reaction: pH 6.6 to 7.8

Bw horizon
Hue: 2.5Y, 10YR, 7.5YR, or 5YR
Value: 3, 4, or 5 dry; 2 or 3 moist
Chroma: 1, 2, or 3
Texture: loam or sandy loam
Clay content: 10 to 18 percent with less than 35 percent fine and coarser sand
Rock fragments: 30 to 70 percent—0 to 20 percent cobbles and stones, 30 to 55 percent pebbles and channers
Reaction: pH 6.6 to 7.8

Bk horizons
Hue: 2.5Y, 10YR, 7.5YR, or 5YR
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Texture: loam or sandy loam
Clay content: 10 to 18 percent with less than 35 percent fine and coarser sand
Rock fragments: 35 to 80 percent—10 to 25 percent cobbles and stones, 25 to 60 percent pebbles and channers
Calcium carbonate equivalent: 3 to 15 percent
Electrical conductivity: 0 to 2 mmhos/cm
Reaction: pH 6.6 to 8.4

282D—Castner channery loam, 4 to 25 percent slopes

Setting

Landform: Hills and bedrock floored plains
Slope: 4 to 25 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Castner and similar soils: 90 percent

Minor Components

Kuro and similar soils: 0 to 5 percent
Cabba and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

280E—Castner-Kuro complex, 4 to 25 percent slopes

Setting

Landform:
Castner—Hills and bedrock floored plains
Kuro—Sedimentary plains and hills
Position on landform:
Castner—Shoulders and summits
Kuro—Backslopes
Slope:
Castner—4 to 25 percent
Kuro—4 to 25 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 16 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Castner and similar soils: 45 percent
Kuro and similar soils: 40 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Castner

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

Kuro

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

281E—Castner-Rock outcrop complex, 8 to 45 percent slopes

Setting

Landform: Hills
Position on landform:
Castner—Backslopes and side slopes
Rock outcrop—Shoulders and summits
Slope: 8 to 45 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Castner and similar soils: 60 percent
Rock outcrop: 25 percent

Minor Components

Kuro and similar soils: 0 to 5 percent
Cabba and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent

Major Component Description

Castner

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.3 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Chinook Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 2 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Coarse-loamy, mixed, superactive Aridic Haploborolls

Typical Pedon

Chinook fine sandy loam, 2 to 8 percent slopes, 500 feet south and 2,400 feet west of the northeast corner of sec. 6, T. 10 N., R. 26 E.

Ap—0 to 4 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; loose, nonsticky and nonplastic; common fine and few medium roots; neutral; clear smooth boundary.

Bw1—4 to 11 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to weak fine subangular blocky; loose, nonsticky and nonplastic; common fine roots; neutral; gradual smooth boundary.

Bw2—11 to 27 inches; light olive brown (2.5Y 5/4) fine sandy loam, olive brown (2.5Y 4/4) moist; weak medium prismatic structure parting to weak fine subangular blocky; loose, nonsticky and nonplastic; few fine roots; moderately alkaline; clear smooth boundary.

Bw3—27 to 34 inches; light yellowish brown (2.5Y 6/4) fine sandy loam, light olive brown (2.5Y 5/4) moist; weak fine subangular blocky structure; loose, nonsticky and nonplastic; moderately alkaline; gradual smooth boundary.

Bk—34 to 60 inches; pale yellow (2.5Y 7/4) fine sandy loam, light olive brown (2.5Y 5/4) moist; weak fine subangular blocky structure; loose, nonsticky and nonplastic; few fine masses of lime; disseminated lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 8 and 24 inches
Mollic epipedon thickness: 7 to 15 inches thick
Depth to Bk horizon: 10 to 35 inches.

Ap horizon
Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Clay content: 5 to 18 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 8.4

Bw1 horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 2, 3, or 4 moist
Chroma: 2, 3, or 4
Textures: fine sandy loam or sandy loam
Clay content: 5 to 18 percent and more than 50 percent medium, fine, and coarser sand
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 8.4

Bw2 and Bw3 horizons
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Textures: fine sandy loam or sandy loam
Clay content: 5 to 18 percent and more than 50 percent medium, fine, and coarser sand
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 9.0

Bk horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Textures: fine sandy loam or sandy loam
Clay content: 5 to 18 percent and more than 50 percent medium, fine, and coarser sand
Rock fragments: 0 to 15 percent pebbles
Calcium carbonate equivalent: 3 to 15 percent
Reaction: pH 6.6 to 9.0

90B—Chinook fine sandy loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet

Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Chinook and similar soils: 85 percent

Minor Components

Busby and similar soils: 0 to 5 percent
Kremlin and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Crago Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) in the upper 21 inches, rapid below this depth (6.0 to 20.0 inches/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 35 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Haplocalcidic Ustochrepts

Typical Pedon

Crago gravelly loam, in an area of Yawdim-Crago complex, 4 to 35 percent slopes, 500 feet south and 500 feet west of the northeast corner of sec. 25, T. 11 N., R. 23 E.

A—0 to 4 inches; light yellowish gray (10YR 6/2) gravelly loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 20 percent pebbles; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk1—4 to 10 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; 35 percent pebbles; continuous distinct lime casts on undersides of pebbles; disseminated lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk2—10 to 21 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine and very roots; 60 percent pebbles; continuous prominent lime casts on surface of pebbles; some cementation between individual pebbles; disseminated lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk3—21 to 37 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; soft, loose, nonsticky and nonplastic; 75 percent pebbles; continuous distinct lime casts on pebbles; some lime cementation between individual pebbles; disseminated lime; violently effervescent; moderately alkaline; gradual wavy boundary.

2C—37 to 60 inches; brownish yellow (10YR 6/6) extremely gravelly loamy sand, yellowish brown (10YR 5/6) moist; massive; loose, nonsticky and nonplastic; 75 percent pebbles; disseminated lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F
Moisture control section: between 4 and 12 inches, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is higher than 41 degrees F
Calcium carbonate equivalent: 10 to 40 inch zone—15 to 60 percent of fine earth fraction and the whole soil, including rock fragments less than 3/4-inch in size, is 40 to 70 percent calcium carbonate equivalent.

A horizon

Hue: 2.5Y through 7.5YR
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Clay content: 15 to 27 percent
Rock fragments: 15 to 35 percent—0 to 10 percent stones and cobbles; 15 to 25 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 2.5Y through 7.5YR
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or sandy clay loam
Clay content: 20 to 35 percent
Rock fragments: 15 to 75 percent—0 to 30 percent stones and cobbles; 15 to 60 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent in the fine earth fraction, 40 to 70 percent for the whole soil including coarse fragments less than 3/4-inch in size
Reaction: pH 7.4 to 8.4

Bk2 and Bk3 horizons

Hue: 2.5Y or 10YR
Value: 6, 7, or 8 dry; 4, 5, 6, or 7 moist
Chroma: 2, 3, or 4
Texture: loam, sandy clay loam, or clay loam
Clay content: 15 to 30 percent
Calcium carbonate equivalent: 15 to 30 percent for fine earth fraction and the whole soil including coarse fragments less than 3/4-inch in size is 40 to 70 percent
Reaction: pH 7.4 to 8.4

2C horizon

Hue: 2.5Y or 10YR
Value: 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, 4, or 6
Texture: loamy sand, coarse sandy loam, sandy loam, or loam
Clay content: 0 to 20 percent
Rock fragments: 40 to 80 percent—0 to 40 percent stones and cobbles; 40 to 80 percent pebbles
Calcium carbonate equivalent: 10 to 25 percent for fine earth fraction and the whole soil including rock fragments less than 3/4-inch in size is 20 to 50 percent
Reaction: pH 7.4 to 8.4

93B—Crago cobbly loam, 1 to 6 percent slopes

Setting

Landform: Relict stream terraces
Slope: 1 to 6 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Crago and similar soils: 85 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

94A—Crago gravelly loam, 0 to 8 percent slopes

Setting

Landform: Relict stream terraces
Slope: 0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Crago and similar soils: 85 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

94E—Crago gravelly loam, 8 to 35 percent slopes

Setting

Landform: Relict stream terraces
Slope: 8 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Crago and similar soils: 85 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

96E—Crago-Abor complex, 4 to 35 percent slopes

Setting

Landform:
Crago—Relict stream terraces
Abor—Sedimentary plains and hills
Position on landform:
Crago—Shoulders and summits
Abor—Backslopes, footslopes, and side slopes
Slope:
Crago—4 to 35 percent
Abor—4 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Crago and similar soils: 45 percent
Abor and similar soils: 40 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent
Verson and similar soils: 0 to 5 percent

Major Component Description

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

95C—Crago-Attewan cobbly loams, 2 to 8 percent slopes

Setting

Landform:
  Crago—Relict stream terraces
  Attewan—Relict stream terraces
Slope:
  Crago—2 to 8 percent
  Attewan—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Crago and similar soils: 45 percent
Attewan and similar soils: 40 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent
Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Crago

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Attewan

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

95B—Crago-Attewan-Musselshell cobbly loams, 0 to 4 percent slopes

Setting

Landform:
  Crago—Relict stream terraces
  Attewan—Relict stream terraces
  Musselshell—Relict stream terraces
Slope:
  Crago—0 to 4 percent
  Attewan—0 to 4 percent
  Musselshell—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Crago and similar soils: 35 percent
Attewan and similar soils: 30 percent
Musselshell and similar soils: 25 percent

Minor Components

Verson and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent

Major Component Description

Crago

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Attewan

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.3 inches

Musselshell

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

95A—Crago-Musselshell cobbly loams, 0 to 4 percent slopes

Setting

Landform:
  Crago—Relict stream terraces
  Musselshell—Relict stream terraces
Slope:
  Crago—0 to 4 percent
  Musselshell—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

  Crago and similar soils: 45 percent
  Musselshell and similar soils: 40 percent

Minor Components

  Attewan and similar soils: 0 to 5 percent
  Verson and similar soils: 0 to 5 percent
  Niart and similar soils: 0 to 5 percent

Major Component Description

Crago

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Musselshell

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

93A—Crago-Musselshell complex, 0 to 4 percent slopes

Setting

Landform:
  Crago—Relict stream terraces
  Musselshell—Relict stream terraces
Slope:
  Crago—0 to 4 percent
  Musselshell—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

  Crago and similar soils: 45 percent
  Musselshell and similar soils: 40 percent

Minor Components

Attewan and similar soils: 0 to 5 percent
Cabbart and similar soils: 0 to 5 percent
Binna and similar soils: 0 to 5 percent

Major Component Description

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

Musselshell

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

56A—Crago-Musselshell-Attewan complex, 0 to 2 percent slopes

Setting

Landform:
Crago—Relict stream terraces
Musselshell—Relict stream terraces
Attewan—Relict stream terraces
Slope:
Crago—0 to 2 percent
Musselshell—0 to 2 percent
Attewan—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Crago and similar soils: 35 percent
Musselshell and similar soils: 30 percent
Attewan and similar soils: 25 percent

Minor Components

Verson and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent

Major Component Description

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

Musselshell

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.5 inches

Attewan

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Creed Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Aridic Natrustalfs

Typical Pedon

Creed loam, in an area of Creed-Gerdrum loams, 0 to 8 percent slopes, 400 feet north and 500 feet west of the southeast corner of sec. 11, T. 10 N., R. 26 E.

Ap—0 to 5 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; thin vesicular crust over weak fine and very fine granular structure; loose, very friable, slightly sticky and slightly plastic; few fine roots; slightly alkaline; abrupt smooth boundary.

Btn—5 to 10 inches; brown (10YR 5/3) silty clay, dark brown (10YR 3/3) moist; strong medium columnar structure parting to strong medium subangular blocky; very hard, firm, sticky and plastic; common distinct clay films on faces of peds and lining pores; few fine and very fine roots; slightly alkaline; clear smooth boundary.

Btnk—10 to 13 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; strong medium columnar structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; common distinct clay films on faces of peds and lining pores; few fine and very fine roots; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bkn—13 to 28 inches; light yellowish brown (2.5Y 6/4) silty clay, light olive brown (2.5Y 5/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; few fine roots; common fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bkny—28 to 35 inches; light yellowish brown (2.5Y 6/4) silty clay, light olive brown (2.5Y 5/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine masses and seams of gypsum; common fine masses of lime; violently effervescent; strongly alkaline; clear smooth boundary.

Byz—35 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay loam, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; common fine seams of gypsum and other salts; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or above
Depth to secondary lime: 10 to 20 inches
Depth to gypsum and other salts: 22 to 30 inches

Ap horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.1 to 8.4

Btn horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam, clay, or silty clay
Clay content: 35 to 55 percent
Rock fragments: 0 to 15 percent pebbles
Electrical conductivity: 2 to 4 mmhos/cm
Sodium adsorption ratio: 8 to 13
Reaction: pH 6.6 to 9.0

Btnk, Bkn, Bkny horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: silty clay loam, clay loam, sandy clay loam, loam, or clay
Rock fragments: 0 to 15 percent pebbles

Clay content: 27 to 45 percent
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 4 to 8 mmhos/cm
Sodium adsorption ratio: 13 to 20
Gypsum: 0 to 2 percent
Reaction: pH 7.9 to 9.0

Byz horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, sandy clay loam, or silty clay loam
Clay content: 25 to 35 percent
Rock fragments: 0 to 15 percent pebbles
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 25
Gypsum: 1 to 5 percent
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

123C—Creed-Gerdrum loams, 0 to 8 percent slopes

Setting

Landform:
Creed—Alluvial fans and stream terraces
Gerdrum—Alluvial fans and stream terraces
Position on landform:
Creed—Microhighs
Gerdrum—Microlows
Slope:
Creed—0 to 8 percent
Gerdrum—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Creed and similar soils: 45 percent
Gerdrum and similar soils: 40 percent

Minor Components

Marvan and similar soils: 0 to 5 percent
Vanda and similar soils: 0 to 5 percent
Marias and similar soils: 0 to 5 percent

Major Component Description

Creed

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.4 inches

Gerdrum

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Dast Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Hills and sedimentary plains
Parent material: Sandstone residuum
Slope range: 2 to 35 percent
Elevation range: 3,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Coarse-loamy, mixed, superactive, frigid Typic Ustochrepts

Typical Pedon

Dast sandy loam, in an area of Ridge-Dast sandy loams, 8 to 45 percent slopes, 1,400 feet west and 600 feet south of the northeast corner of sec. 26, T. 8 N., R. 28 E.

A—0 to 5 inches; light olive brown (2.5Y 5/4) sandy loam, olive brown (2.5Y 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine and few medium roots; 10 percent channers; slightly alkaline; clear smooth boundary.

Bw—5 to 18 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine and few medium roots; 10 percent channers; disseminated lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bk—18 to 33 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine and few medium roots; 10 percent channers; common distinct lime casts on undersides of channers; disseminated lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Cr—33 to 60 inches; semiconsolidated sandy sedimentary beds.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 8 and 24 inches
Depth to Bk horizon: 12 to 24 inches
Depth to bedrock: 20 to 40 inches

A horizon
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: fine sandy loam or sandy loam
Clay content: 2 to 18 percent
Rock fragments: 0 to 15 percent pebbles or channers
Reaction: pH 7.4 to 8.4

Bw horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: fine sandy loam, sandy loam, or loam
Clay content: 2 to 18 percent
Rock fragments: 0 to 15 percent pebbles or channers
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Bk horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: fine sandy loam, sandy loam, or loam
Clay content: 2 to 18 percent
Rock fragments: 0 to 15 percent pebbles or channers
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

242D—Dast-Ridge sandy loams, 2 to 8 percent slopes

Setting

Landform:
Dast—Sedimentary plains
Ridge—Sedimentary plains
Position on landform:
Dast—Footslopes
Ridge—Backslopes
Slope:
Dast—2 to 8 percent
Ridge—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Dast and similar soils: 45 percent
Ridge and similar soils: 40 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Doney and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent

Major Component Description

Dast

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Ridge

Surface layer texture: Sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Delplain Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Hills
Parent material: Residuum or colluvium derived from sandstone and shale
Slope range: 4 to 25 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey-skeletal, mixed, nonacid, superactive, frigid Lithic Ustorthents

Typical Pedon

Delplain channery clay loam, in an area of Hinterland-Delplain complex, 8 to 25 percent slopes, 200 feet east and 300 feet north of the southwest corner sec. 33, T. 11 N., R. 25 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) channery clay loam, dark grayish brown (2.5Y 4/2) moist; weak very fine granular structure; soft, friable, sticky and plastic; common fine and very fine roots; 20 percent channers; slightly acid; clear smooth boundary.

C—3 to 12 inches; grayish brown (2.5Y 5/2) extremely channery clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; soft, friable, sticky and plastic; common fine and very fine roots; 80 percent channers; slightly acid; clear smooth boundary.

R—12 inches; hard shale and sandstone.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Depth to bedrock: 10 to 20 inches

A horizon
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 27 to 40 percent
Rock fragments: 20 to 35 percent—0 to 5 percent flagstones; 20 to 30 percent channers
Reaction: pH 6.1 to 7.8

C horizon
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay loam or clay
Clay content: 35 to 45 percent
Rock fragments: 45 to 85 percent—0 to 5 percent flagstones; 45 to 80 percent channers
Reaction: pH 6.1 to 7.8

Delpoint Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated sedimentary beds
Slope range: 2 to 35 percent
Elevation range: 2,710 to 4,600 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aridic Ustochrepts

Typical Pedon

Delpoint loam, in an area of Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes, 1,000 feet south and 400 feet west of the northeast corner of sec. 22, T. 9 N., R. 27 E.

Ap—0 to 3 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; strongly effervescent; moderately alkaline; clear smooth boundary.

Bw—3 to 11 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk—11 to 22 inches; light gray (10YR 7/2) loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; disseminated lime; many fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Cr—22 to 60 inches; semiconsolidated sedimentary beds.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Depth to Bk horizon: 10 to 20 inches
Depth to bedrock: 20 to 40 inches

Ap horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Clay content: 18 to 27 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 0 to 10 percent
Reaction: pH 6.6 to 8.4

Bw horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or silty clay loam
Clay content: 18 to 35 percent clay
Rock fragments: 0 to 15 percent pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 6.6 to 8.4

Bk horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, sandy loam, clay loam, or silty clay loam
Clay content: 18 to 35 percent clay
Rock fragments: 0 to 15 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 9.0

31B—Delpoint loam, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 85 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent
Cabbart and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

39B—Delpoint loam, calcareous, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 85 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Cabbart and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

87B—Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes

Setting

Landform:
  Delpoint—Sedimentary plains
  Cabbart—Sedimentary plains
Position on landform:
  Delpoint—Backslopes, footslopes, and side slopes
  Cabbart—Shoulders and summits
Slope:
  Delpoint—2 to 8 percent
  Cabbart—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 45 percent
Cabbart and similar soils: 40 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent
Yamacall, calcareous soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.6 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

39C—Delpoint, calcareous-Cabbart-Yamacall loams, 4 to 15 percent slopes

Setting

Landform:
  Delpoint—Sedimentary plains and hills
  Cabbart—Sedimentary plains and hills
  Yamacall—Sedimentary plains and hills
Position on landform:
  Delpoint—Backslopes, footslopes, and side slopes
  Cabbart—Shoulders and summits
  Yamacall—Footslopes and toeslopes
Slope:
  Delpoint—4 to 15 percent
  Cabbart—4 to 15 percent
  Yamacall—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 35 percent
Cabbart and similar soils: 30 percent
Yamacall and similar soils: 25 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

287D—Delpoint, dry-Cabbart moist loams, 2 to 8 percent slopes

Setting

Landform:
Delpoint—Sedimentary plains
Cabbart—Sedimentary plains
Position on landform:
Delpoint—Backslopes, footslopes, and side slopes
Cabbart—Shoulders and summits
Slope:
Delpoint—2 to 6 percent
Cabbart—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 45 percent
Cabbart and similar soils: 40 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land

Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

81B—Delpoint-Cabbart loams, 2 to 8 percent slopes

Setting

Landform:
  Delpoint—Sedimentary plains
  Cabbart—Sedimentary plains
Position on landform:
  Delpoint—Backslopes, footslopes, and side slopes
  Cabbart—Shoulders and summits
Slope:
  Delpoint—2 to 8 percent
  Cabbart—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 45 percent
Cabbart and similar soils: 40 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Eapa and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

81C—Delpoint-Cabbart loams, 8 to 15 percent slopes

Setting

Landform:
  Delpoint—Hills
  Cabbart—Hills
Position on landform:
  Delpoint—Backslopes, footslopes, and side slopes
  Cabbart—Shoulders and summits
Slope:
  Delpoint—8 to 15 percent
  Cabbart—8 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 45 percent
Cabbart and similar soils: 40 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

288D—Delpoint-Cabbart-Havre loams, 4 to 25 percent slopes

Setting

Landform:
  Delpoint—Sedimentary plains and hills
  Cabbart—Hills
  Havre—Flood plains
Position on landform:
  Delpoint—Backslopes, footslopes, and side slopes
  Cabbart—Shoulders and summits
Slope:
  Delpoint—4 to 15 percent
  Cabbart—8 to 25 percent
  Havre—4 to 6 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

  Delpoint and similar soils: 35 percent
  Cabbart and similar soils: 25 percent
  Havre and similar soils: 20 percent

Minor Components

  Yamacall and similar soils: 0 to 10 percent
  Blacksheep and similar soils: 0 to 5 percent
  Twilight and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Rare
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

88D—Delpoint-Cabbart-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform:
Delpoint—Sedimentary plains and hills
Cabbart—Sedimentary plains and hills
Position on landform:
Delpoint—Backslopes, footslopes, and side slopes
Cabbart—Backslopes and side slopes
Rock outcrop—Shoulders and summits
Slope:
Delpoint—4 to 15 percent
Cabbart—4 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 35 percent
Cabbart and similar soils: 30 percent
Rock outcrop: 25 percent

Minor Components

Yawdim and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

31C—Delpoint-Cabbart-Yamacall loams, 4 to 15 percent slopes

Setting

Landform:
Delpoint—Sedimentary plains and hills
Cabbart—Sedimentary plains and hills
Yamacall—Sedimentary plains and hills
Position on landform:
Delpoint—Backslopes, footslopes, and side slopes
Cabbart—Shoulders and summits
Yamacall—Footslopes and toeslopes
Slope:
Delpoint—4 to 15 percent
Cabbart—4 to 15 percent
Yamacall—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 35 percent
Cabbart and similar soils: 30 percent
Yamacall and similar soils: 25 percent

Minor Components

Twilight and similar soils: 0 to 5 percent
Megonot and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

131C—Delpoint-Yamacall loams, 2 to 8 percent slopes

Setting

Landform:
  Delpoint—Sedimentary plains
  Yamacall—Sedimentary plains
Position on landform:
  Delpoint—Shoulders and summits
  Yamacall—Backslopes, footslopes, and side slopes
Slope:
  Delpoint—2 to 8 percent
  Yamacall—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Delpoint and similar soils: 45 percent
Yamacall and similar soils: 40 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent

Major Component Description

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

DA—Denied access

Composition

Major Components

Denied Access: 100 percent

Major Component Description

Definition: Areas where mapping access was denied by landowner

Doney Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Hills and sedimentary plains
Parent material: Semiconsolidated sedimentary beds
Slope range: 4 to 60 percent
Elevation range: 3,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Ustocrepts

Typical Pedon

Doney loam, in an area of Cabba-Doney loams, 4 to 15 percent slopes, 1,200 feet south and 50 feet east of the northwest corner of sec. 36, T. 6 N., R. 25 E.

Ap—0 to 4 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak fine and very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; abrupt smooth boundary.

Bw1—4 to 10 inches; light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 5/4) moist; strong medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; neutral; clear wavy boundary.

Bw2—10 to 14 inches; pale brown (10YR 6/3) clay loam, light olive brown (2.5Y 5/4) moist; strong medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk—14 to 26 inches; pale yellow (2.5Y 7/4) clay loam, light yellowish brown (2.5Y 6/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine irregular masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cr—26 to 60 inches; semiconsolidated sedimentary beds.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Moisture control section: between 4 and 12 inches
Depth to bedrock: 20 to 40 inches

Ap horizon
- Hue: 10YR or 2.5Y
- Value: 5 or 6 dry; 4 or 5 moist
- Chroma: 1, 2, or 3
- Clay content: 10 to 27 percent
- Rock fragments: 0 to 15 percent pebbles
- Reaction: pH 6.6 to 8.4

Bw horizons
- Hue: 10YR or 2.5Y
- Value: 5, 6, or 7 dry; 4, 5, or 6 moist
- Chroma: 2, 3, or 4
- Texture: loam, clay loam, or silty clay loam
- Clay content: 18 to 30 percent
- Rock fragments: 0 to 15 percent pebbles
- Calcium carbonate equivalent: 5 to 15 percent
- Reaction: pH 7.9 to 9.0

Bk horizon
- Hue: 10YR or 2.5Y
- Value: 6 or 7 dry; 5 or 6 moist
- Chroma: 2, 3, or 4
- Texture: loam, clay loam, or silty clay loam
- Clay content: 18 to 30 percent
- Rock fragments: 0 to 30 percent—0 to 10 percent cobbles; 0 to 20 percent pebbles and channers
- Calcium carbonate equivalent: 5 to 15 percent
- Reaction: pH 7.9 to 9.0

281D—Doney-Cabba-Macar loams, 4 to 15 percent slopes

Setting

Landform:
- Doney—Hills
- Cabba—Hills
- Macar—Alluvial fans

Position on landform:
- Doney—Backslopes, footslopes, and side slopes
- Cabba—Shoulders and summits
- Macar—Footslopes

Slope:
- Doney—8 to 15 percent

Cabba—8 to 15 percent
Macar—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Doney and similar soils: 35 percent
Cabba and similar soils: 30 percent
Macar and similar soils: 30 percent

Minor Components

Barvon and similar soils: 0 to 5 percent

Major Component Description

Doney

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

Cabba

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.8 inches

Macar

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

284F—Doney-Wayden complex, 15 to 60 percent slopes

Setting

Landform:
Doney—Hills
Wayden—Hills
Position on landform:
Doney—Backslopes
Wayden—Shoulders and summits
Slope:
Doney—15 to 60 percent
Wayden—15 to 60 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Doney and similar soils: 40 percent
Wayden and similar soils: 25 percent

Minor Components

Cabba and similar soils: 0 to 10 percent
Areas of rock outcrop: 0 to 15 percent
Ridge and similar soils: 0 to 10 percent

Major Component Description

Doney

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Eapa Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive Aridic Argiborolls

Typical Pedon

Eapa loam, in an area of Eapa-Attewan loams, 0 to 2 percent slopes, 500 feet east and 500 feet north of the southwest corner of sec. 6, T. 9 N., R. 23 E.

A—0 to 5 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to strong fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly alkaline; clear smooth boundary.

Bt1—5 to 10 inches; dark grayish brown (2.5Y 4/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate coarse prismatic structure parting to strong medium subangular blocky; hard, friable, sticky and plastic; few faint clay films bridging sand grains; many fine and very fine roots; slightly alkaline; clear smooth boundary.

Bt2—10 to 15 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; strong medium prismatic structure parting to strong medium subangular blocky; hard, friable, sticky and plastic; common distinct clay films on faces of peds; common fine and very fine roots; slightly alkaline; clear smooth boundary.

Bk—15 to 32 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; strong medium prismatic structure; hard, firm, sticky and slightly plastic; common fine and very fine roots; many fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bky—32 to 60 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; strongly effervescent; few fine masses of lime and gypsum; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 16 inches

A horizon
Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 6.1 to 8.4

Bt horizons
Hue: 10YR or 2.5Y
Value: 3 or 4 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 24 to 35 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 6.1 to 8.4

Bk horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or sandy clay loam
Clay content: 20 to 35 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 6.6 to 8.4

Bky horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 1, 2, 3, or 4
Texture: clay loam or loam
Clay content: 15 to 30 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 15 percent
Gypsum: 0 to 1 percent
Reaction: pH 7.4 to 8.4

52A—Eapa loam, 0 to 2 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Eapa and similar soils: 85 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Eapa, calcareous soils: 0 to 5 percent
Ethridge and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

52B—Eapa loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Eapa and similar soils: 85 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Eapa, calcareous soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

152A—Eapa-Attewan loams, 0 to 2 percent slopes

Setting

Landform:
Eapa—Alluvial fans and stream terraces
Attewan—Relict stream terraces
Slope:
Eapa—0 to 2 percent
Attewan—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Eapa and similar soils: 45 percent
Attewan and similar soils: 40 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent
Ethridge and similar soils: 0 to 5 percent

Major Component Description

Eapa

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

Attewan

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Ethridge Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic Torrertic Argiborolls

Typical Pedon

Ethridge clay loam, 0 to 2 percent slopes, 2,000 feet south and 2,500 feet west of the northeast corner of sec. 14, T. 11 N., R. 22 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine and common medium roots; slightly alkaline; clear smooth boundary.

Bt—6 to 14 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and plastic; few distinct clay films on faces of peds; common fine and very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk—14 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine prismatic structure parting to strong medium subangular blocky; hard, firm, sticky and plastic; common fine and few very fine roots; common medium masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bky—25 to 43 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; very hard, very firm, very sticky and very plastic; common fine roots; few fine masses of lime and gypsum; violently effervescent; moderately alkaline; gradual smooth boundary.

BC—43 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, very sticky and very plastic; few fine roots; disseminated lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 14 inches
Depth to Bk horizon: 10 to 20 inches

Ap horizon
Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Clay content: 27 to 35 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.1 to 7.8

Bt horizon
Hue: 10YR or 2.5Y
Value: 3 or 4 moist
Chroma: 2, 3, or 4
Texture: clay, silty clay, or silty clay loam
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.6 to 8.4

Bk horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay, silty clay loam, or clay loam
Clay content: 30 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Bky horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay loam, silt loam, or silty clay loam
Clay content: 25 to 40 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 2 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 15 percent
Gypsum: 1 to 3 percent
Reaction: pH 7.4 to 8.4

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay loam, silt loam, or silty clay loam
Clay content: 25 to 40 percent slopes
Rock fragments: 0 to 5 percent
Electrical conductivity: 2 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 10 percent
Gypsum: 0 to 3 percent
Reaction: pH 7.4 to 8.4

51A—Ethridge clay loam, 0 to 2 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Ethridge and similar soils: 85 percent

Minor Components

Tanna and similar soils: 0 to 5 percent
Eapa and similar soils: 0 to 5 percent
Verson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

51B—Ethridge clay loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Ethridge and similar soils: 85 percent

Minor Components

Tanna and similar soils: 0 to 5 percent
Eapa and similar soils: 0 to 5 percent
Verson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained

Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

158A—Ethridge-Verson clay loams, 0 to 2 percent slopes

Setting

Landform:
  Ethridge—Alluvial fans and stream terraces
  Verson—Relict stream terraces
Slope:
  Ethridge—0 to 2 percent
  Verson—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Ethridge and similar soils: 45 percent
Verson and similar soils: 40 percent

Minor Components

Eapa and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent
Kobase and similar soils: 0 to 5 percent

Major Component Description

Ethridge

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.8 inches

Verson

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Fergus Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Stream terraces and alluvial fans
Parent material: Alluvium
Slope range: 2 to 8 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, mixed, superactive Typic Argiborolls

Typical Pedon

Fergus clay loam, 2 to 8 percent slopes, 900 feet north and 150 feet west of the southeast corner of sec. 8, T. 11 N., R. 22 E.

A—0 to 6 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.

Bt—6 to 15 inches; reddish brown (5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; strong medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many distinct clay films on faces of peds; slightly alkaline; clear smooth boundary.

Btk—15 to 20 inches; reddish brown (5YR 5/3) clay loam, dark reddish brown (5YR 3/3) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many distinct clay films on faces of peds; many medium irregular masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk1—20 to 46 inches; reddish brown (5YR 5/3) clay loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many fine and very fine irregular masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk2—46 to 60 inches; reddish brown (5YR 5/4) clay loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common fine and very fine irregular masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 12 inches
Depth to Bk horizon: 20 to 36 inches

A horizon
Hue: 5YR, 7.5YR, or 10YR
Value: 3, 4, or 5 dry; 2 or 3 moist
Clay content: 27 to 35 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 7.8

Bt horizon
Hue: 2.5YR, 5YR, or 7.5YR
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2, 3, 4, or 6
Texture: clay loam, clay, or silty clay loam
Clay content: 35 to 50 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 7.8

Btk horizon
Hue: 2.5YR, 5YR, or 7.5YR
Value: 4, 5, 6, or 7 dry; 3, 4, or 5 moist
Chroma: 2, 3, 4, or 6
Texture: silty clay loam, clay loam, or clay
Clay content: 27 to 45 percent
Rock fragments: 0 to 15 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 9.0

Bk horizons
Hue: 2.5YR, 5YR, or 7.5YR
Value: 4, 5, 6, or 7 dry; 3, 4, or 5 moist
Chroma: 2, 3, 4, or 6
Texture: silty clay loam, clay loam, or clay
Clay content: 27 to 45 percent
Rock fragments: 0 to 15 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 9.0

254C—Fergus clay loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Fergus and similar soils: 90 percent

Minor Components

Darret and similar soils: 0 to 5 percent
Terrad and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Gerdrum Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Torrertic Natrustalfs

Typical Pedon

Gerdrum loam, in an area of Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes, 1,300 feet south and 410 feet west of the northeast corner of sec. 33, T. 11 N., R. 29 E.

A—0 to 1 inch; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.

E—1 to 3 inches; pale brown (10YR 6/3) loam, dark grayish brown (10YR 4/2) moist; weak very fine platy structure parting to moderate medium granular; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; abrupt smooth boundary.

Btn—3 to 10 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; very hard, very friable, very sticky and very plastic; common fine roots; slightly alkaline; clear smooth boundary.

Btkn—10 to 23 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; moderate medium prismatic structure parting to strong medium subangular blocky; very hard, friable, very sticky and very plastic; common fine roots; disseminated lime; few fine masses of lime; slightly effervescent; moderately alkaline; clear wavy boundary.

Bknyz—23 to 48 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; moderate medium and fine subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common medium irregular masses of lime, gypsum and other salts; violently effervescent; strongly alkaline; gradual wavy boundary.

Cknyz—48 to 60 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; massive; hard, friable, sticky and plastic; common medium masses of lime, gypsum and other salts; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or above
Depth to k horizon: 10 to 24 inches
Depth to gypsum: 10 to 28 inches

A horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 7.8

E horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 7.8

Btn horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay, silty clay, or silty clay loam
Clay content: 35 to 55 percent
Rock fragments: 0 to 10 percent pebbles
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 10 to 20
Reaction: pH 7.4 to 9.0

Btkn horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: clay, silty clay, silty clay loam, or clay loam
Clay content: 35 to 55 percent
Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 13 to 20
Reaction: pH 7.4 to 9.0

Bknyz and Cknyz horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay loam, sandy clay loam, clay, or silty clay
Clay content: 30 to 50 percent
Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 30

Gypsum: 1 to 5 percent
Reaction: pH 7.9 to 9.0

23C—Gerdrum-Creed loams, 0 to 8 percent slopes

Setting

Landform:
Gerdrum—Alluvial fans and stream terraces
Creed—Alluvial fans and stream terraces
Position on landform:
Gerdrum—Microlows
Creed—Microhighs
Slope:
Gerdrum—0 to 8 percent
Creed—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Gerdrum and similar soils: 45 percent
Creed and similar soils: 40 percent

Minor Components

Vanda and similar soils: 0 to 5 percent
Marvan and similar soils: 0 to 5 percent
Zatoville and similar soils: 0 to 5 percent

Major Component Description

Gerdrum

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.2 inches

Creed

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

23A—Gerdrum-Vanda complex, 0 to 8 percent slopes

Setting

Landform:
Gerdrum—Alluvial fans and stream terraces
Vanda—Alluvial fans and stream terraces
Position on landform:
Gerdrum—Microhighs
Vanda—Microlows
Slope:
Gerdrum—0 to 8 percent
Vanda—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Gerdrum and similar soils: 45 percent
Vanda and similar soils: 40 percent

Minor Components

Creed and similar soils: 0 to 10 percent
Marvan and similar soils: 0 to 5 percent

Major Component Description

Gerdrum

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.2 inches

Vanda

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 1.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

23B—Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes

Setting

Landform:
  Gerdrum—Alluvial fans and stream terraces
  Vanda—Alluvial fans and stream terraces
  Creed—Alluvial fans and stream terraces
Position on landform:
  Gerdrum—Microhighs
  Vanda—Microlows
  Creed—Microhighs
Slope:
  Gerdrum—0 to 8 percent
  Vanda—0 to 8 percent
  Creed—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Gerdrum and similar soils: 35 percent
Vanda and similar soils: 30 percent
Creed and similar soils: 25 percent

Minor Components

Zatoville and similar soils: 0 to 5 percent
Marvan and similar soils: 0 to 5 percent

Major Component Description

Gerdrum

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.2 inches

Vanda

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 10.8 inches

Creed

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Glendive Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Coarse-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents

Typical Pedon

Glendive fine sandy loam in an area of Havre-Glendive complex, 0 to 2 percent slopes, 150 feet north and 800 feet west of the southeast corner of sec. 13, T. 8 N., R. 25 E.

Ap—0 to 8 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine and few medium roots; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—8 to 14 inches; light brownish gray (2.5Y 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and few medium roots; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—14 to 60 inches; light brownish gray (2.5Y 6/2) fine sandy loam with thin layers of loam, sandy loam, and loamy fine sand, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 8 and 24 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher

Ap horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Clay content: 5 to 15 percent
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 6.6 to 9.0

C1 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, silt loam, sandy loam, or fine sandy loam
Clay content: 5 to 18 percent
Rock fragments: 0 to 15 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 9.0

C2 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: sandy loam or fine sandy loam consisting of thin layers of loam, sandy loam, silt loam, loamy sand, loamy fine sand, and occasionally clay loam
Clay content: 5 to 18 percent
Rock fragments: 0 to 15 percent pebbles
Electrical conductivity: 2 to 8 mmhos/cm
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 9.0

Harlake Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, calcareous, frigid Aridic Ustifluvents

Typical Pedon

Harlake silty clay, 0 to 2 percent slopes, 2,250 feet west and 1,400 feet north of the southeast corner of sec. 27, T. 9 N., R 28 E.

A—0 to 5 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; very hard, firm, very sticky and very plastic; many fine and very fine roots; moderately alkaline; clear wavy boundary.

C1—5 to 15 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; moderate medium and coarse subangular blocky structure; hard, firm, very sticky and very plastic; many fine and very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

C2—15 to 60 inches; pale brown (10YR 6/3) silty clay with thin strata of silty clay loam, loam, and sandy loam, brown (10YR 5/3) moist; massive; hard, firm, sticky and plastic; few fine and medium roots; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil

temperature at a depth of 20 inches is 41 degrees F or higher

A horizon
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 35 to 55 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 0 to 8
Calcium carbonate equivalent: 0 to 10 percent
Reaction: pH 6.6 to 8.4

C1 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay, silty clay, clay loam, or silty clay loam
Clay content: 35 to 60 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 0 to 13
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

C2 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay, silty clay, clay loam, or silty clay loam consisting of stratified layers of clay, silt loam, silty clay loam, and silty clay
Clay content: 35 to 60 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 0 to 13
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

5A—Harlake silty clay, 0 to 2 percent slopes

Setting

Landform: Flood plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Harlake and similar soils: 85 percent

Minor Components

Havre and similar soils: 0 to 8 percent
Bigsandy and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

6A—Harlake silty clay, 0 to 2 percent slopes, occasionally flooded

Setting

Landform: Flood plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Harlake and similar soils: 85 percent

Minor Components

Havre and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Harlake and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

8B—Harlake-Havre complex, 0 to 2 percent slopes

Setting

Landform:
Harlake—Flood plains
Havre—Flood plains
Slope:
Harlake—0 to 2 percent
Havre—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Harlake and similar soils: 45 percent
Havre and similar soils: 40 percent

Minor Components

Glendive and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 10 percent

Major Component Description

Harlake

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.6 inches

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Rare
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

8A—Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded

Setting

Landform:
Harlake—Flood plains
Havre—Flood plains
Slope:
Harlake—0 to 2 percent
Havre—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Harlake and similar soils: 45 percent
Havre and similar soils: 40 percent

Minor Components

Glendive and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Havre and similar soils: 0 to 5 percent

Major Component Description

Harlake

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.6 inches

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

17A—Harlake-Havre complex, calcareous, 0 to 2 percent slopes

Setting

Landform:
  Harlake—Flood plains
  Havre—Flood plains
Slope:
  Harlake—0 to 2 percent
  Havre—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Harlake and similar soils: 45 percent
Havre and similar soils: 40 percent

Minor Components

Havre and similar soils: 0 to 4 percent
Bigsandy and similar soils: 0 to 3 percent
Harlake and similar soils: 0 to 4 percent
Glendive and similar soils: 0 to 4 percent

Major Component Description

Harlake

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.6 inches

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

20B—Harlake-Marvan-Vanda silty clays, 0 to 4 percent slopes

Setting

Landform:
  Harlake—Flood plains
  Marvan—Alluvial fans and stream terraces
  Vanda—Alluvial fans and stream terraces
Slope:
  Harlake—0 to 2 percent
  Marvan—0 to 4 percent
  Vanda—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Harlake and similar soils: 35 percent
Marvan and similar soils: 30 percent
Vanda and similar soils: 25 percent

Minor Components

Gerdrum and similar soils: 0 to 5 percent
Creed and similar soils: 0 to 5 percent

Major Component Description

Harlake

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.6 inches

Marvan

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.9 inches

Vanda

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Havre Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 6 percent
Elevation range: 2,710 to 4,600 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents

Typical Pedon

Havre loam, in an area of Havre-Yamacall loams, 0 to 4 percent slopes, 200 feet north and 500 feet west of the southeast corner of sec. 34, T. 9 N., R. 27 E.

Ap—0 to 4 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; disseminated lime; strongly effervescent; slightly alkaline; abrupt smooth boundary.

C1—4 to 9 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; disseminated lime; strongly effervescent; slightly alkaline; clear smooth boundary.

C2—9 to 22 inches; light gray (2.5Y 7/2) clay loam with thin strata of loam and silt loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; disseminated lime; strongly effervescent; moderately alkaline; clear smooth boundary.

C3—22 to 60 inches; light gray (2.5Y 7/2) clay loam with thin strata of loam and sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; disseminated lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher

Ap horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 10 to 27 percent
Calcium carbonate equivalent: 1 to 10 percent
Electrical conductivity: 0 to 2 mmhos/cm
Sodium adsorption ratio: 0 to 4
Reaction: pH 6.1 to 8.4

C1 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: loam, silt loam, or clay loam
Clay content: 18 to 35 percent
Calcium carbonate equivalent: 1 to 10 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 0 to 13
Reaction: pH 7.4 to 9.0

C2 and C3 horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6 or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: loam, silt loam, or clay loam which consist of strata of silt loam, fine sandy loam, silty clay loam, and clay loam
Clay content: 18 to 35 percent
Calcium carbonate equivalent: 1 to 10 percent
Electrical conductivity: 0 to 4 mmhos/cm

Sodium adsorption ratio: 0 to 13
Reaction: pH 7.4 to 9.0

9A—Havre loam, 0 to 2 percent slopes

Setting

Landform: Flood plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 85 percent

Minor Components

Harlake and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Glendive and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Rare
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

10A—Havre loam, 0 to 2 percent slopes, occasionally flooded

Setting

Landform: Flood plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 85 percent

Minor Components

Harlake and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Havre and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

13A—Havre loam, calcareous, 0 to 2 percent slopes

Setting

Landform: Flood plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 85 percent

Minor Components

Havre and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 3 percent
Harlake and similar soils: 0 to 3 percent
Glendive and similar soils: 0 to 4 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

14A—Havre, calcareous-Glendive complex, 0 to 2 percent slopes

Setting

Landform:
Havre—Flood plains
Glendive—Flood plains
Slope:
Havre—0 to 2 percent
Glendive—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Glendive and similar soils: 40 percent

Minor Components

Havre and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Harlake and similar soils: 0 to 5 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.7 inches

Glendive

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 7.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

14B—Havre, calcareous-Glendive complex, 0 to 2 percent slopes, occasionally flooded

Setting

Landform:
Havre—Flood plains
Glendive—Flood plains
Slope:
Havre—0 to 2 percent
Glendive—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Glendive and similar soils: 40 percent

Minor Components

Havre and similar soils: 0 to 10 percent
Bigsandy and similar soils: 0 to 5 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

Glendive

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 7.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

11A—Havre-Glendive complex, 0 to 2 percent slopes

Setting

Landform:
Havre—Flood plains
Glendive—Flood plains
Slope:
Havre—0 to 2 percent
Glendive—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Glendive and similar soils: 40 percent

Minor Components

Harlake and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 10 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Rare
Available water capacity: Mainly 9.7 inches

Glendive

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 7.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

11B—Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded

Setting

Landform:
Havre—Flood plains
Glendive—Flood plains
Slope:
Havre—0 to 2 percent
Glendive—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Glendive and similar soils: 40 percent

Minor Components

Harlake and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Havre and similar soils: 0 to 5 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

Glendive

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 7.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

15A—Havre-Harlake complex, calcareous, 0 to 2 percent slopes

Setting

Landform:
Havre—Flood plains
Harlake—Flood plains
Slope:
Havre—0 to 2 percent
Harlake—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Harlake and similar soils: 40 percent

Minor Components

Havre and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Harlake and similar soils: 0 to 5 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.7 inches

Harlake

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

12A—Havre-Harlake complex, channeled, 0 to 2 percent slopes

Setting

Landform:
Havre—Flood plains
Harlake—Flood plains
Slope:
Havre—0 to 2 percent
Harlake—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Harlake and similar soils: 40 percent

Minor Components

Glendive and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Havre and similar soils: 0 to 5 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

Harlake

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 7.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

9B—Havre-Yamacall loams, 0 to 4 percent slopes

Setting

Landform:
  Havre—Flood plains
  Yamacall—Alluvial fans and stream terraces
Slope:
  Havre—0 to 2 percent
  Yamacall—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Yamacall and similar soils: 40 percent

Minor Components

Harlake and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Glendive and similar soils: 0 to 5 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

16A—Havre-Yamacall loams, calcareous, 0 to 4 percent slopes

Setting

Landform:
  Havre—Flood plains
  Yamacall—Alluvial fans and stream terraces
Slope:
  Havre—0 to 2 percent
  Yamacall—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Havre and similar soils: 45 percent
Yamacall and similar soils: 40 percent

Minor Components

Havre and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 3 percent
Bigsandy and similar soils: 0 to 2 percent

Major Component Description

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Available water capacity: Mainly 9.7 inches

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Hilger Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains
Parent material: Alluvium or colluvium
Slope range: 4 to 35 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Typic Argiborolls

Typical Pedon

Hilger stony loam, 4 to 25 percent slopes, 1,900 feet south and 1,300 feet west of the northeast corner of sec. 8, T. 11 N., R. 22 E.

A—0 to 4 inches; dark grayish brown (10YR 4/2) stony loam, very dark grayish brown (10YR 3/2) moist; weak fine and very fine granular structure; loose, nonsticky and nonplastic; many fine and very fine roots; 15 percent stones, 10 percent cobbles, 5 percent pebbles; neutral; clear wavy boundary.

Bt1—4 to 9 inches; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 25 percent stones, 10 percent cobbles, 10 percent pebbles; common distinct clay films on faces of peds and on surface of coarse fragments; neutral; clear wavy boundary.

Bt2—9 to 18 inches; dark yellowish brown (10YR 4/4) very stony clay loam, dark yellowish brown (10YR 3/4) moist; weak medium prismatic structure parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; 25 percent stones, 15 percent cobbles, 10 percent pebbles; many distinct clay films on faces of peds and on surface of coarse fragments; neutral; clear wavy boundary.

Bk1—18 to 30 inches; pale brown (10YR 6/3) extremely stony clay loam, brown (10YR 5/3) moist; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; 35 percent stones, 25 percent cobbles, 15 percent pebbles; many fine and medium irregular masses of lime, common distinct lime casts on the underside of coarse fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—30 to 60 inches; pale brown (10YR 6/3) extremely stony loam, brown (10YR 5/3) moist; moderate fine and very fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; 35 percent stones, 25 percent cobbles, 15 percent pebbles; many fine and medium irregular masses of lime, common distinct lime casts on the underside of coarse fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 14 inches
Depth to calcic horizon: 13 to 24 inches

A horizon
Hue: 7.5YR or 10YR
Value: 3 or 4 dry; 2 or 3 moist
Clay content: 15 to 27 percent
Rock fragments: 15 to 35 percent—10 to 25 percent cobbles and stones; 5 to 10 percent pebbles
Reaction: pH 6.6 to 7.8

Bt horizons
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or sandy clay loam
Clay content: 25 to 35 percent
Rock fragments: 35 to 80 percent—35 to 60 percent cobbles, stones, and boulders; 10 to 30 percent pebbles
Reaction: pH 7.4 to 8.4

Bk horizons
Hue: 2.5Y, 10YR, or 7.5YR
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: loam, sandy loam, or clay loam
Clay content: 15 to 35 percent

Rock fragments: 35 to 85 percent—25 to 70 percent cobbles, stones, and boulders; 15 to 35 percent pebbles
Calcium carbonate equivalent: 10 to 30 percent
Reaction: pH 7.9 to 8.4

252E—Hilger stony loam, 4 to 25 percent slopes

Setting

Landform: Mountains
Slope: 4 to 25 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Hilger and similar soils: 85 percent

Minor Components

Blaincreek and similar soils: 0 to 5 percent
Quinncreek and similar soils: 0 to 5 percent
Shamut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

252D—Hilger-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform: Mountains
Position on landform:
Hilger—Backslopes and side slopes
Rock outcrop—Shoulders and summits
Slope: 4 to 35 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Hilger and similar soils: 60 percent
Rock outcrop: 25 percent

Minor Components

Blaincreek and similar soils: 0 to 5 percent
Quinncreek and similar soils: 0 to 5 percent
Shamut and similar soils: 0 to 5 percent

Major Component Description

Hilger

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.7 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Hinterland Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.20 to 0.60 inch/hour)
Landform: Hills, sedimentary plains, and bedrock floored plains
Parent material: Material derived from hard sandstone
Slope range: 1 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey, smectitic Lithic Argiborolls

Typical Pedon

Hinterland loam, 1 to 6 percent slopes, 200 feet north and 2,600 feet west of the southeast corner of sec. 32, T. 11 N., R. 25 E.

A—0 to 3 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many fine and very fine pores; neutral; clear smooth boundary.

Bt1—3 to 6 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; many very fine roots; many fine and very fine pores; many distinct clay films on faces of peds; neutral; clear smooth boundary.

Bt2—6 to 12 inches; brown (10YR 4/3) channery clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; many very fine roots; many very fine pores; many distinct clay films of faces of peds; 20 percent sandstone channers; neutral; clear smooth boundary.

R—12 inches; hard fractured sandstone with thin clay skins on surface of rock fragments in the upper 6 inches.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or above; is not dry in the moisture control section during June and the first half of July
Mollic epipedon thickness: 7 to 12 inches
Depth to bedrock: 10 to 20 inches

A horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent channers or pebbles
Reaction: pH 6.6 to 7.8

Bt1 horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Texture: clay loam or silty clay loam
Clay content: 27 to 35 percent
Rock fragments: 0 to 15 percent—0 to 5 percent stones and cobbles; 0 to 10 percent pebbles or channers
Reaction: pH 6.6 to 7.8

Bt2 horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Texture: clay loam or clay
Clay content: 35 to 45 percent
Rock fragments: 15 to 35 percent—0 to 5 percent stones and cobbles; 15 to 30 percent pebbles or channers
Reaction: pH 6.6 to 7.8

50B—Hinterland loam, 1 to 6 percent slopes

Setting

Landform: Bedrock-floored plains
Slope: 1 to 6 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Hinterland and similar soils: 85 percent

Minor Components

Yawdim and similar soils: 0 to 5 percent
Delplain and similar soils: 0 to 5 percent
Weingart and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

50C—Hinterland loam, 6 to 15 percent slopes

Setting

Landform: Sedimentary plains and hills
Slope: 6 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Hinterland and similar soils: 85 percent

Minor Components

Delplain and similar soils: 0 to 5 percent
Weingart and similar soils: 0 to 5 percent
Warhorse and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

50D—Hinterland-Delplain complex, 8 to 25 percent slopes

Setting

Landform:
    Hinterland—Hills
    Delplain—Hills
Position on landform:
    Hinterland—Backslopes, footslopes, and side slopes
    Delplain—Shoulders and summits
Slope:
    Hinterland—8 to 15 percent
    Delplain—8 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Hinterland and similar soils: 45 percent
Delplain and similar soils: 40 percent

Minor Components

Rentsac and similar soils: 0 to 5 percent
Weingart and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Hinterland

Surface layer texture: Clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

Delplain

Surface layer texture: Channery clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Interbedded sandstone and shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Hughesville Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains

Parent material: Colluvium or residuum
Slope range: 2 to 25 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Taxonomic Class: Loamy-skeletal, carbonatic Udic Haploborolls

Typical Pedon

Hughesville very flaggy clay loam, in an area of Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes, 250 feet north and 400 feet west of the southeast corner of sec. 36, T. 13 N., R. 17 E., Fergus County, Montana.

A—0 to 2 inches; dark grayish brown (10YR 4/2) flaggy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; 15 percent cobbles, 10 percent angular pebbles; slightly alkaline; clear wavy boundary.

Bw—2 to 10 inches; brown (10YR 4/3) very flaggy clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; many fine, medium, and coarse roots; 30 percent angular cobbles, 15 percent angular pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk1—10 to 22 inches; pale brown (10YR 6/3) very flaggy heavy loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; 35 percent angular cobbles, 15 percent angular pebbles; few fine masses of lime; common distinct lime casts on coarse fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—22 to 32 inches; light gray (10YR 7/2) extremely flaggy loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; 35 percent angular cobbles, 10 percent stones, 30 percent angular pebbles; disseminated lime; few fine masses of lime; common distinct lime casts on coarse fragments; violently effervescent; moderately alkaline; clear wavy boundary.

Bk3—32 to 38 inches; white (10YR 8/2) extremely flaggy loam, very pale brown (10YR 7/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine and few medium roots; 40 percent angular cobbles, 10 percent stones, 25 percent angular medium pebbles; disseminated lime; few fine masses of lime; common distinct lime casts on coarse fragments; violently effervescent; moderately alkaline.

R—38 inches; fractured hard limestone.

Range in Characteristics

Soil temperature: 41 to 44 degrees F
Moisture control section: 4 to 12 inches, moist in some or all of its parts throughout the year in 6 or more out of 10 years
Mollic epipedon thickness: 7 to 13 inches
Depth to bedrock: 20 to 40 inches
Depth to calcic horizon: 7 to 13 inches

A horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 1 or 2
Clay content: 27 to 35 percent
Rock fragments: 20 to 35 percent—0 to 5 percent stones; 10 to 15 percent angular cobbles; 10 to 15 percent angular pebbles.
Reaction: pH 6.6 to 7.8

Bw horizon
Hue: 2.5YR to 2.5Y
Value: 4 or 5 dry; 3 moist
Chroma: 2 or 3
Texture: loam, clay loam, or silty clay loam
Clay content: 27 to 35 percent
Rock fragments: 35 to 60 percent—0 to 5 percent stones; 25 to 35 percent cobbles; 10 to 20 percent pebbles
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 7.4 to 8.4

Bk1 horizon
Hue: 7.5YR to 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 3
Texture: loam, clay loam, or silty clay loam
Clay content: 18 to 35 percent
Rock fragments: 35 to 60 percent—0 to 5 percent stones; 25 to 35 percent cobbles; 10 to 20 percent pebbles
Calcium carbonate equivalent: 40 to 50 percent
Reaction: pH 7.4 to 8.4

Bk2 and Bk3 horizons
Hue: 10YR to 5Y

Value: 7 or 8 dry; 6 or 7 moist
Chroma: 2 or 3
Texture: loam, clay loam, or silty clay loam
Clay content: 18 to 35 percent
Rock fragments: 60 to 90 percent—0 to 10 percent stones; 35 to 40 percent cobbles; 25 to 40 percent pebbles
Calcium carbonate equivalent: 50 to 60 percent
Reaction: pH 7.9 to 9.0
Note: The Hughesville soil as mapped in Musselshell County is a taxadjunct to the series. It classifies as a Typic Haploboroll.

232E—Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes

Setting

Landform:
  Hughesville—Mountains
  Tibs—Mountains
  Whitecow—Mountains
Position on landform:
  Hughesville—Shoulders and summits
  Tibs—Backslopes
  Whitecow—Backslopes
Slope:
  Hughesville—2 to 25 percent
  Tibs—2 to 25 percent
  Whitecow—2 to 25 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Hughesville and similar soils: 30 percent
Tibs and similar soils: 25 percent
Whitecow and similar soils: 25 percent

Minor Components

Sheege and similar soils: 0 to 10 percent
Tomty and similar soils: 0 to 5 percent
Delette and similar soils: 0 to 5 percent

Major Component Description

Hughesville

Surface layer texture: Very flaggy clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.5 inches

Tibs

Surface layer texture: Cobbly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Whitecow

Surface layer texture: Flaggy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Kobase Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Torrertic Ustochrepts

Typical Pedon

Kobase silty clay loam, 0 to 8 percent slopes, 1,500 feet west and 500 feet south of the northeast corner of sec. 28, T. 10 N., R. 24 E.

A—0 to 6 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure; hard, friable, sticky and plastic; many fine roots; slightly effervescent; slightly alkaline; clear wavy boundary.

Bw—6 to 15 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common fine roots; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk1—15 to 24 inches; light olive brown (2.5Y 5/4) silty clay loam, olive brown (2.5Y 4/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common fine roots; disseminated lime; few fine masses of lime; strongly effervescent; strongly alkaline; gradual wavy boundary.

Bk2—24 to 39 inches; light yellowish brown (2.5Y 6/4) silty clay loam, light olive brown (2.5Y 5/4) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common fine irregular masses of lime; violently effervescent; strongly alkaline; gradual wavy boundary.

Bky—39 to 60 inches; light yellowish brown (2.5Y 6/4) silty clay loam, grayish brown (2.5Y 5/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common fine irregular masses of lime and gypsum; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or higher
Depth to Bk horizon: 12 to 17 inches
Depth to Bky horizon: 20 to 40 inches

A horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 27 to 40 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 0 to 2 mmhos/cm
Sodium adsorption ratio: 0 to 5
Calcium carbonate equivalent: 0 to 10 percent
Reaction: pH 6.6 to 8.4

Bw horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 1, 2, 3, or 4
Texture: silty clay loam, silty clay, or clay
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 0 to 2 mmhos/cm
Sodium adsorption ratio: 0 to 5
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Bk1 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 1, 2, 3, or 4
Texture: silty clay loam, silty clay, or clay
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 0 to 2 mmhos/cm
Sodium adsorption ratio: 0 to 10
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Bk2 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: silty clay loam, silty clay, or clay
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 0 to 2 mmhos/cm
Sodium adsorption ratio: 8 to 13
Calcium carbonate equivalent: 5 to 15 percent
Reaction: 7.9 to 8.4

Bky horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 1, 2, 3, or 4
Texture: silty clay loam, silty clay, or clay
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 8 to 13
Calcium carbonate equivalent: 5 to 15 percent
Gypsum: 1 to 5 percent
Reaction: pH 7.9 to 9.0

40B—Kobase silty clay loam, 0 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Kobase and similar soils: 85 percent

Minor Components

Zatoville and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent
Marvan and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

40C—Kobase silty clay loam, calcareous, 0 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Kobase and similar soils: 85 percent

Minor Components

Kobase and similar soils: 0 to 5 percent
Zatoville and similar soils: 0 to 5 percent
Yamacall and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

140B—Kobase-Megonot silty clay loams, 0 to 8 percent slopes

Setting

Landform:
  Kobase—Alluvial fans and stream terraces
  Megonot—Sedimentary plains
Position on landform:
  Kobase—Footslopes and toeslopes
  Megonot—Backslopes, footslopes, and side slopes
Slope:
  Kobase—0 to 8 percent
  Megonot—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Kobase and similar soils: 45 percent
Megonot and similar soils: 40 percent

Minor Components

Zatoville and similar soils: 0 to 5 percent
Orinoco and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Kobase

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Megonot

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

140C—Kobase-Megonot silty clay loams, calcareous, 0 to 8 percent slopes

Setting

Landform:
  Kobase—Alluvial fans and stream terraces
  Megonot—Sedimentary plains
Position on landform:
  Kobase—Footslopes and toeslopes
  Megonot—Backslopes, footslopes, and side slopes
Slope:
  Kobase—0 to 8 percent
  Megonot—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Kobase and similar soils: 45 percent
Megonot and similar soils: 40 percent

Minor Components

Kobase and similar soils: 0 to 5 percent
Megonot and similar soils: 0 to 5 percent
Zatoville and similar soils: 0 to 5 percent

Major Component Description

Kobase

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Megonot

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

38A—Kobase-Zatoville silty clay loams, 0 to 8 percent slopes

Setting

Landform:
  Kobase—Alluvial fans and stream terraces
  Zatoville—Alluvial fans and stream terraces
Slope:
  Kobase—0 to 8 percent
  Zatoville—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Kobase and similar soils: 45 percent
Zatoville and similar soils: 40 percent

Minor Components

Yamacall and similar soils: 0 to 5 percent
Marvan and similar soils: 0 to 5 percent
Marias and similar soils: 0 to 5 percent

Major Component Description

Kobase

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Zatoville

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 7.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Korchea Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 3,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive, calcareous, frigid Mollic Ustifluvents

Typical Pedon

Korchea loam, in an area of Shambo-Korchea-Barvon loams, 2 to 8 percent slopes, 1,200 feet east and 600 feet north of the southwest corner of sec. 15, T. 6 N., R. 25 E.

A—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

C1—6 to 13 inches; light brownish gray (10YR 6/2) stratified loam and fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

C2—13 to 32 inches; light brownish gray (10YR 6/2) stratified fine sandy loam and loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

C3—32 to 60 inches; pale brown (10YR 6/3) stratified fine sandy loam and gravelly fine sandy loam, brown (10YR 5/3) moist; massive; loose, very friable, slightly sticky and slightly plastic; common very fine roots; slightly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches

A horizon
Hue: 10YR or 2.5Y
Value: 3, 4, or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 18 to 27 percent
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 6.6 to 8.4

C horizons
Hue: 2.5Y or 10YR
Value: 4, 5, 6, or 7 dry; 3, 4, 5, or 6 moist
Chroma: 2 to 4
Texture: loam, silt loam, silty clay loam, clay loam, fine sandy loam, sandy loam, or very fine sandy loam
Clay content: 18 to 35 percent
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Kremlin Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive Aridic Haploborolls

Typical Pedon

Kremlin loam, 2 to 8 percent slopes, 1,300 feet west and 2,500 feet south of the northeast corner of sec. 13, T. 11 N., R. 25 E.

Ap—0 to 6 inches; brown (10YR 5/3) loam, dark brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; slightly acid; clear smooth boundary.

Bw1—6 to 10 inches; olive brown (2.5Y 4/4) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to moderate medium angular blocky; hard, friable, sticky and slightly plastic; common very fine and fine roots; neutral; clear wavy boundary.

Bw2—10 to 15 inches; olive brown (2.5Y 4/4) loam, dark brown (10YR 3/3) moist; strong medium prismatic structure; hard, friable, sticky and slightly plastic; common very fine roots; neutral; clear wavy boundary.

Bk1—15 to 22 inches; light olive brown (2.5Y 5/4) loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; disseminated lime; few fine masses of lime; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk2—22 to 43 inches; light yellowish brown (2.5Y 6/4) loam, light olive brown (2.5Y 5/4) moist; weak coarse prismatic structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; disseminated lime; few fine irregular masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

BC—43 to 60 inches; light olive brown (2.5Y 5/4) loam, olive brown (2.5Y 4/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in some part six-tenths or more of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher
Mollic epipedon thickness: 7 to 15 inches
Depth to Bk horizon: 10 to 24 inches

Ap horizon
Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Clay content: 18 to 27 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.1 to 7.8

Bw horizons
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: loam, silt loam, or clay loam
Clay content: 18 to 30 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.6 to 7.8

Bk1 horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: loam, silt loam, clay loam, or sandy clay loam
Clay content: 18 to 30 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 0 to 2 mmhos/cm
Reaction: pH 7.4 to 8.4

Bk2 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, silt loam, clay loam, or sandy clay loam
Clay content: 18 to 30 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Effervescence: strongly or violently
Electrical conductivity: 0 to 2 mmhos/cm
Reaction: pH 7.4 to 8.4

BC horizon
- Hue: 10YR, 2.5Y, or 5Y
- Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
- Chroma: 2, 3, or 4
- Texture: loam, silt loam, clay loam, or sandy clay loam
- Clay content: 18 to 30 percent
- Rock fragments: 0 to 5 percent pebbles
- Calcium carbonate equivalent: 5 to 10 percent
- Electrical conductivity: 0 to 2 mmhos/cm
- Reaction: pH 7.4 to 8.4

91A—Kremlin loam, 0 to 2 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Kremlin and similar soils: 85 percent

Minor Components

Chinook and similar soils: 0 to 5 percent
Eapa and similar soils: 0 to 5 percent
Frazer and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

91B—Kremlin loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Kremlin and similar soils: 85 percent

Minor Components

Chinook and similar soils: 0 to 5 percent
Eapa and similar soils: 0 to 5 percent
Frazer and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Kuro Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Hills and sedimentary plains
Parent material: Residuum
Slope range: 4 to 25 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 16 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents

Typical Pedon

Kuro silty clay loam, in an area of Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes, 900 feet west and 2,400 feet south of the northeast corner of sec. 5, T. 11 N., R. 22 E.

A—0 to 3 inches; light reddish brown (5YR 6/3) silty clay loam, dark reddish brown (5YR 3/3) moist; weak fine granular structure; slightly hard, friable, sticky and plastic; many fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

C1—3 to 8 inches; light reddish brown (5YR 6/3) silty clay loam, dark reddish brown (5YR 3/3) moist; strong fine platy structure; hard, firm, sticky and plastic; many fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

C2—8 to 15 inches; reddish brown (5YR 5/3) silty clay loam, reddish brown (5YR 4/3) moist; strong fine and medium platy structure; very hard, firm, sticky and plastic; common fine and very fine roots; slightly effervescent; moderately alkaline; clear wavy boundary.

Cr—15 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 42 to 47 degrees
Moisture control section: between 4 and 12 inches
Depth to bedrock: 10 to 20 inches

A horizon
Hue: 10R, 5YR, or 2.5YR
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Clay content: 30 to 40 percent
Rock fragments: 0 to 15 percent shale fragments
Calcium carbonate equivalent: 0 to 5
Reaction: pH 6.6 to 7.8

C horizons
Hue: 10R, 5YR, or 2.5YR
Value: 3, 4, or 5 dry; 2, 3, or 4 moist
Chroma: 2, 3, or 4
Texture: clay loam or silty clay loam
Clay content: 35 to 45 percent
Rock fragments: 0 to 35 percent shale fragments
Calcium carbonate equivalent: 1 to 5
Reaction: pH 7.4 to 8.4

260F—Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform:
Kuro—Sedimentary plains and hills
Wayden—Hills
Position on landform:
Kuro—Backslopes
Wayden—Shoulders and summits
Rock outcrop—Shoulders and summits
Slope:
Kuro—4 to 15 percent
Wayden—8 to 25 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 16 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Kuro and similar soils: 40 percent
Wayden and similar soils: 30 percent
Rock outcrop: 20 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Castner and similar soils: 0 to 5 percent

Major Component Description

Kuro

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 2.8 inches

Rock outcrop

Definition: Areas of exposed shale bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Lamedeer Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Hills and sedimentary plains
Parent material: Alluvium or colluvium
Slope range: 2 to 45 percent
Elevation range: 4,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Ustochrepts

Typical Pedon

Lamedeer channery loam, in an area of Lamedeer-Ringling channery loams, 2 to 8 percent slopes, 1,800 feet west and 2,100 feet south of the northeast corner of sec. 32, T. 7 N., R. 27 E.

A—0 to 5 inches; reddish brown (5YR 4/3) channery loam, dark reddish brown (5YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 20 percent channers; neutral; clear smooth boundary.

Bw1—5 to 19 inches; reddish brown (5YR 4/4) channery loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 20 percent channers; neutral; clear smooth boundary.

Bw2—19 to 34 inches; reddish brown (5YR 5/4) very channery loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; 35 percent channers, 15 percent flagstones; slightly alkaline; gradual wavy boundary.

Bk—34 to 60 inches; light reddish brown (2.5YR 6/4) extremely channery loam, reddish brown (2.5YR 5/4) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; 40 percent channers, 25 percent angular flagstones; many faint lime casts on undersides of coarse fragments; disseminated lime; slightly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 44 to 47 degrees F
Moisture control section: between the depths of 4 and 12 inches
Depth to calcic horizon: 30 to 40 inches

A horizon
Hue: 5YR or 7.5YR
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Clay content: 12 to 23 percent
Rock fragments: 15 to 35 percent channers
Reaction: pH 6.1 to 7.3

Bw1 horizon
Hue: 5YR or 7.5YR
Value: 4, 5, or 6 dry; 3 or 4 moist
Chroma: 3 or 4
Clay content: 15 to 25 percent
Rock fragments: 15 to 50 percent channers
Reaction: pH 6.6 to 7.8

Bw2 horizon
Hue: 5YR or 7.5YR
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 3 or 4
Texture, less than 2 mm: loam or sandy loam
Clay content: 15 to 20 percent
Rock fragments: 50 to 70 percent—15 to 25 percent flagstones; 35 to 45 percent channers
Reaction: pH 7.4 to 7.8

Bk horizon
Hue: 2.5YR, 5YR, or 7.5YR
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture, less than 2 mm: loam or sandy loam
Clay content: 8 to 20 percent
Rock fragments: 50 to 70 percent—15 to 25 percent flagstones; 35 to 45 percent channers
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

245C—Lamedeer-Ringling channery loams, 2 to 8 percent slopes

Setting

Landform:
Lamedeer—Sedimentary plains
Ringling—Sedimentary plains
Slope:
Lamedeer—2 to 8 percent
Ringling—2 to 8 percent
Elevation: 4,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Lamedeer and similar soils: 65 percent
Ringling and similar soils: 25 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Birney and similar soils: 0 to 5 percent

Major Component Description

Lamedeer

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.1 inches

Ringling

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Scoria residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

245F—Lamedeer-Ringling channery loams, 4 to 45 percent slopes

Setting

Landform:
Lamedeer—Hills
Ringling—Sedimentary plains and hills
Slope:
Lamedeer—15 to 45 percent
Ringling—4 to 45 percent
Elevation: 4,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Lamedeer and similar soils: 50 percent
Ringling and similar soils: 35 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Coors and similar soils: 0 to 5 percent
Birney and similar soils: 0 to 5 percent

Major Component Description

Lamedeer

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.1 inches

Ringling

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Scoria residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

246F—Lamedeer-Ringling channery loams, moist, 4 to 45 percent slopes

Setting

Landform:
Lamedeer—Hills
Ringling—Sedimentary plains and hills
Slope:
Lamedeer—15 to 45 percent
Ringling—4 to 45 percent
Elevation: 4,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Lamedeer and similar soils: 50 percent
Ringling and similar soils: 35 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Coors and similar soils: 0 to 5 percent
Birney and similar soils: 0 to 5 percent

Major Component Description

Lamedeer

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.1 inches

Ringling

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Scoria residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Lostriver Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, calcareous, frigid Aridic Ustifluvents

Typical Pedon

Lostriver silty clay, in an area of Lostriver-Bullhook complex, 0 to 2 percent slopes, 900 feet east and 1,200 feet north of the southwest corner of sec. 11, T. 11 N., R. 26 E.

A—0 to 3 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate coarse platy structure parting to moderate fine and medium granular; hard, firm, sticky and plastic; many very fine to coarse roots; moderately alkaline; abrupt smooth boundary.

C—3 to 7 inches; grayish brown (2.5Y 5/2) silty clay with thin strata of clay loam and silty clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure; hard, firm, sticky and plastic; few very fine to medium roots; moderately alkaline; gradual smooth boundary.

Cyz—7 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam with thin strata of clay loam and silty clay, grayish brown (2.5Y 5/2) moist; massive; very hard, firm, very sticky and plastic; few very fine and fine roots; many fine irregular masses of gypsum and other salts; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or higher

A horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Clay content: 40 to 55 percent

Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 8 to 13
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 7.4 to 9.4

C horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam, or silty clay with or without thin strata of loam, clay loam, or silty clay loam
Clay content: 35 to 55 percent
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 20
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 7.4 to 9.6

Cyz horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 3, 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: clay loam, silty clay loam, or silty clay with or without thin strata of loam, clay loam, or silty clay
Clay content: 35 to 55 percent
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 30
Gypsum: 2 to 5 percent
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 9.6

7A—Lostriver silty clay, 0 to 2 percent slopes

Setting

Landform: Flood plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Lostriver and similar soils: 85 percent

Minor Components

Harlake and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 10 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

7B—Lostriver-Bullhook complex, 0 to 2 percent slopes

Setting

Landform:
Lostriver—Flood plains
Bullhook—Flood plains
Slope:
Lostriver—0 to 2 percent
Bullhook—0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Lostriver and similar soils: 45 percent
Bullhook and similar soils: 40 percent

Minor Components

Havre and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 5 percent
Harlake and similar soils: 0 to 5 percent

Major Component Description

Lostriver

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium

Native plant cover type: Rangeland
Flooding: Rare
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 8.5 inches

Bullhook

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 8.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Macar Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.60 to 2.00 inches/hr)
Landform: Alluvial fans
Parent material: Alluvium
Slope range: 2 to 8 percent
Elevation range: 3,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost free period: 90 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Ustochrepts

Typical Pedon

Macar loam, in an area of Doney-Cabba-Macar loams, 4 to 15 percent slopes, 190 feet west and 600 feet south of the northeast corner of sec. 9, T. 5 N., R 24 E.

A—0 to 5 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, sticky and plastic; common very fine to coarse roots; neutral; clear smooth boundary.

Bw—5 to 11 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; many fine and medium roots; slightly alkaline; clear smooth boundary.

Bk1—11 to 13 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few fine roots; few fine soft masses of lime; disseminated lime; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk2—13 to 16 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; moderate coarse subangular blocky structure; slightly hard, friable, sticky and plastic; few fine roots; many fine and medium soft masses of lime; disseminated lime; violently effervescent; moderately alkaline; clear smooth boundary.

BC—16 to 28 inches; light gray (10YR 7/2) stratified loam and sandy loam, grayish brown (10YR 5/2) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; disseminated lime; violently effervescent; moderately alkaline; clear smooth boundary.

C—28 to 60 inches; very pale brown (10YR 7/3) stratified loam and sandy loam, brown (10YR 5/3) moist; massive; soft, friable, nonsticky and nonplastic; disseminated lime; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Depth to the Bk horizon: 11 to 24 inches

A horizon
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 18 to 35 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
Reaction: pH 6.6 to 8.4
Note: The A horizon does not meet the requirements for a mollic epipedon after mixing to 7 inches.

Bw horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 3, 4, or 5 moist
Chroma: 2, 3, 4, or 6
Texture: loam or clay loam
Clay content: 18 to 35 percent

Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.6 to 8.4

Bk1 horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, 4, or 6
Texture: clay loam or loam
Clay content: 18 to 35 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Bk2 horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, 4, or 6
Texture: clay loam, loam, sandy clay loam, or silty clay loam
Clay content: 18 to 35 with 35 to 55 percent fine sand and coarser
Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 8 to 15 percent
Reaction: pH 7.4 to 8.4

BC and C horizons
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, 4, or 6
Texture: loam, silty clay loam, or sandy clay loam consisting of strata of fine sandy loam and sandy clay loam
Clay content: 15 to 30 percent
Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 5 to 12 percent
Reaction: pH 7.4 to 9.0

230C—Macar loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans
Slope: 2 to 8 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

Macar and similar soils: 90 percent

Minor Components

Shambo and similar soils: 0 to 5 percent
Doney and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Macmeal Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Hills
Parent material: Alluvium or colluvium
Slope range: 4 to 35 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs.

Typical Pedon

Macmeal channery loam, in an area of Macmeal-Rock outcrop complex, 4 to 35 percent slopes, 2,300 feet east and 400 feet north of the southwest corner of sec. 7, T. 11 N., R. 22 E.

A—0 to 4 inches; grayish brown (10YR 5/2) channery loam, very dark grayish brown (10YR 3/2) moist; weak fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; 25 percent channers, few flagstones; slightly acid; clear smooth boundary.

E—4 to 11 inches; pale brown (10YR 6/3) channery loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; 25 percent channers, few flagstones; slightly acid; clear smooth boundary.

Bt1—11 to 22 inches; yellowish brown (10YR 5/4) very channery clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to strong medium subangular blocky; hard, firm, slightly sticky and slightly plastic; few fine roots; common distinct clay films on faces of peds; 55 percent channers, 5 percent flagstones; slightly acid; clear smooth boundary.

Bt2—22 to 36 inches; yellowish brown (10YR 5/4) very channery clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine roots; common faint clay films on faces of peds; 30 percent channers, 20 percent flagstones; neutral; gradual smooth boundary.

Btk—36 to 48 inches; yellowish brown (10YR 5/4) very flaggy clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; 30 percent channers, 30 percent flagstones; common distinct clay films on faces of peds; many fine irregular masses of lime; common distinct lime casts on undersides of fragments; strongly effervescent; slightly alkaline; gradual wavy boundary.

Bk—48 to 60 inches; light gray (10YR 7/2) extremely flaggy clay loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; 35 percent channers, 30 percent flagstones; many fine and medium irregular masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 44 degrees F
Moisture control section: between 4 and 12 inches

A horizon
Hue: 10YR or 7.5YR
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2 or 3
Clay content: 10 to 25 percent
Rock fragments: 15 to 35 percent—0 to 10 percent cobbles or flagstones; 15 to 25 percent pebbles or channers
Reaction: pH 6.1 to 7.3

E horizon
Hue: 10YR or 7.5YR
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Clay content: 10 to 25 percent
Rock fragments: 15 to 35 percent—0 to 10 percent cobbles or flagstones; 15 to 25 percent pebbles or channers
Reaction: pH 6.1 to 7.3

Bt horizons
Hue: 10YR or 7.5YR
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 3 or 4
Clay content: 27 to 35 percent
Rock fragments: 5 to 20 percent cobbles or flagstones; 30 to 60 percent pebbles or channers
Reaction: pH 6.1 to 7.3

Btk and Bk horizons
Hue: 10YR or 7.5YR
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Clay content: 27 to 35 percent
Rock fragments: 35 to 80 percent—10 to 30 percent cobbles or flagstones; 25 to 50 percent pebbles or channers
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

250E—Macmeal-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform: Hills
Position on landform:
Macmeal—Backslopes and side slopes
Rock outcrop—Shoulders and summits
Slope: 4 to 35 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Macmeal and similar soils: 60 percent
Rock outcrop: 25 percent

Minor Components

Trapps and similar soils: 0 to 5 percent
Geohrock and similar soils: 0 to 10 percent

Major Component Description

Macmeal

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Forest land

Flooding: None
Available water capacity: Mainly 4.5 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Marias Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Chromic Udic Haplusterts

Typical Pedon

Marias silty clay, 0 to 4 percent slopes, 1,000 feet south and 2,000 feet west of the northeast corner of sec. 23, T. 11 N., R. 27 E.

Ap—0 to 4 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong very fine granular structure; loose, friable, very sticky and plastic; many fine and very fine roots; slightly effervescent; moderately alkaline; abrupt smooth boundary.

Bw—4 to 9 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; moderate coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, sticky and very plastic; many fine and very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bss—9 to 28 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; moderate coarse angular blocky structure parting to strong fine angular blocky; extremely hard, firm, sticky and very plastic; common slickensides and pressure faces; many fine and very fine roots; slightly effervescent; strongly alkaline; gradual smooth boundary.

By—28 to 60 inches; light brownish gray (2.5Y 6/2) clay, grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; extremely hard, firm, sticky and very plastic; many fine and very fine roots; common large and medium irregular masses of gypsum; slightly effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher
Depth to By horizon: 20 to 45 inches

Ap horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 1, 2, or 3
Clay content: 40 to 60 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 1 to 4
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.4 to 8.4.

Bw horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay or silty clay
Clay content: 40 to 60 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 1 to 4
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

Bss horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay or silty clay
Clay content: 40 to 60 percent
Slickensides: common or many
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 1 to 4
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

By horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 1, 2, or 3
Texture: clay or silty clay
Clay content: 40 to 60 percent
Gypsum: 1 to 6 percent
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 4 to 13
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

63A—Marias silty clay, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Marias and similar soils: 85 percent

Minor Components

Marvan and similar soils: 0 to 5 percent
Ethridge and similar soils: 0 to 5 percent
Vanda and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Marmarth Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated sandy sedimentary beds
Slope range: 0 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive Aridic Argiborolls

Typical Pedon

Marmarth fine sandy loam, in an area of Marmarth-Cabbart complex, 2 to 8 percent slopes, 1,600 feet south and 1,000 feet west of the northeast corner of sec. 11, T. 10 N., R. 26 E.

Ap—0 to 4 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; common fine and very fine roots; neutral; abrupt smooth boundary.

Bt—4 to 8 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common faint clay films in root channels and on faces of peds; few fine and very fine roots; slightly alkaline; abrupt smooth boundary.

Btk—8 to 13 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common faint clay films in root channels and on faces of peds; few very fine roots; few fine masses of lime; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk—13 to 31 inches; light yellowish brown (10YR 6/4) fine sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure parting to single grain; loose, nonsticky and nonplastic; few very fine roots; disseminated lime; common medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Cr—31 to 60 inches; semiconsolidated sandy sedimentary beds.

Range in Characteristics

Mollic epipedon thickness: 7 to 16 inches
Depth to Cr horizon: 20 to 40 inches

Ap horizon
Hue: 10YR
Value: 3, 4, or 5 moist
Chroma: 2 or 3
Texture: loam or fine sandy loam
Clay content: 10 to 27 percent
Reaction: pH 6.1 to 7.3

Bt horizon
Hue: 10YR or 2.5Y
Value: 3, 4, 5, or 6 moist
Chroma: 2 to 4
Texture: loam, clay loam, or sandy clay loam
Clay content: 18 to 35 percent
Reaction: pH 6.1 to 7.8

Btk and Bk horizons
Hue: 2.5Y or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 to 4
Texture: loam, fine sandy loam, or clay loam
Clay content: 15 to 30 percent
Calcium carbonate equivalent: 5 to 15
Reaction: pH 7.4 to 8.4

54A—Marmarth fine sandy loam, 0 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Marmarth and similar soils: 90 percent

Minor Components

Eapa and similar soils: 0 to 5 percent
Tanna and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

154C—Marmarth-Cabbart loams, 2 to 8 percent slopes

Setting

Landform:
Marmarth—Sedimentary plains
Cabbart—Sedimentary plains
Position on landform:
Marmarth—Backslopes, footslopes, and side slopes
Cabbart—Shoulders and summits
Slope:
Marmarth—2 to 8 percent
Cabbart—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Marmarth and similar soils: 45 percent
Cabbart and similar soils: 40 percent

Minor Components

Tanna and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Amherst and similar soils: 0 to 5 percent

Major Component Description

Marmarth

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Marvan Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Sodic Haplusterts

Typical Pedon

Marvan silty clay, 0 to 8 percent slopes, 2,200 feet north and 1,800 feet west of the southeast corner of sec. 5, T. 9 N., R. 30 E.

A—0 to 2 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong medium and fine granular structure; slightly hard, firm, sticky and plastic; few fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—2 to 9 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong coarse prismatic structure parting to strong medium subangular blocky; very hard, very firm, very sticky and plastic; few fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bss—9 to 17 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong coarse subangular blocky structure; very hard, very firm, very sticky and plastic; few slickensides; few fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bssy—17 to 30 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong medium subangular blocky structure; very hard, very firm, very sticky and plastic; few slickensides; few very fine roots; common fine irregular masses and seams of gypsum; moderately alkaline; diffuse wavy boundary.

Byz—30 to 60 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; very hard, very firm, very sticky and plastic; common fine irregular masses and seams of gypsum and other salts; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher
Depth to Bssy horizon: 10 to 24 inches

A horizon
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Clay content: 40 to 60 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 0 to 4
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.4 to 8.4

Bw and Bss horizons
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay or silty clay
Clay content: 45 to 60 percent
Electrical conductivity: 2 to 4 mmhos/cm
Sodium adsorption ratio: 4 to 13
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

Bssy horizon
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay or silty clay

Clay content: 45 to 60 percent
Gypsum: 1 to 5 percent
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 38
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

Byz horizon
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay or silty clay
Clay content: 45 to 60 percent
Gypsum: 1 to 5 percent
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 38
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

64B—Marvan silty clay, 0 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Marvan and similar soils: 85 percent

Minor Components

Vanda and similar soils: 0 to 5 percent
Marias and similar soils: 0 to 5 percent
Creed and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

64A—Marvan-Vanda silty clays, 0 to 8 percent slopes

Setting

Landform:
Marvan—Alluvial fans and stream terraces
Vanda—Alluvial fans and stream terraces
Slope:
Marvan—0 to 8 percent
Vanda—0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Marvan and similar soils: 45 percent
Vanda and similar soils: 40 percent

Minor Components

Marias and similar soils: 0 to 5 percent
Creed and similar soils: 0 to 5 percent
Gerdrum and similar soils: 0 to 5 percent

Major Component Description

Marvan

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.9 inches

Vanda

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

McKenzie Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Poorly drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Closed depressions
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Chromic Endoaquerts

Typical Pedon

McKenzie silty clay, 0 to 2 percent slopes, 1,300 feet east and 1,700 feet south of the northwest corner of sec. 23, T. 9 N., R. 24 E.

A—0 to 4 inches; dark grayish brown (2.5Y 4/2) silty clay, very dark grayish brown (2.5Y 3/2) moist; hard, very firm, sticky and very plastic; moderate medium subangular blocky structure; common fine and very fine roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bg—4 to 25 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; moderate medium and coarse columnar structure; very hard, very firm, sticky and very plastic; few fine and very fine roots; few fine yellow (2.5Y 7/8) redox concentrations; slightly effervescent; strongly alkaline; clear smooth boundary.

Cg1—25 to 45 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; weak medium and coarse columnar structure; very hard, very firm, sticky and very plastic; few very fine roots; few slickensides; many fine yellow (2.5Y 7/8) redox concentrations; few fine irregular masses of lime; strongly effervescent; strongly alkaline; clear smooth boundary.

Cg2—45 to 60 inches; light olive gray (5Y 6/2) silty clay, olive gray (5Y 5/2) moist; massive; very hard, very firm, sticky and very plastic; common fine yellow (2.5Y 7/8) redox concentrations; few fine and very fine masses of gypsum and soluble salts; slightly effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Depth to seasonal high water table: 12 to 24 inches

A horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 1 or 2
Clay content: 40 to 60 percent
Electrical conductivity: 2 to 8 mmhos/cm
Calcium carbonate equivalent: 1 to 15 percent
Reaction: pH 6.6 to 9.0

Bg horizon
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 1 or 2
Texture: clay or silty clay
Clay content: 40 to 60 percent
Electrical conductivity: 2 to 8 mmhos/cm
Calcium carbonate equivalent: 3 to 15 percent
Reaction: pH 6.6 to 9.0

Cg horizons
Hue: 2.5Y or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 1, 2, or 3
Texture: clay or silty clay
Clay content: 40 to 60 percent
Gypsum: 0 to 4 percent
Electrical conductivity: 2 to 8 mmhos/cm
Calcium carbonate equivalent: 3 to 15 percent
Reaction: pH 7.9 to 9.0

21A—McKenzie silty clay, 0 to 2 percent slopes

Setting

Landform: Closed depressions
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

McKenzie and similar soils: 90 percent

Minor Components

Marvan and similar soils: 0 to 5 percent
Gerdrum and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Perched
Salt affected: Saline within 30 inches
Available water capacity: Mainly 9.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Megonot Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains and hills
Parent material: Residuum
Slope range: 0 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Torrertic Ustochrepts

Typical Pedon

Megonot silty clay loam in an area of Megonot-Yawdim silty clay loams, 4 to 15 percent slopes, 1,800 feet west and 600 feet north of the southeast corner of sec. 1, T. 11 N., R. 25 E.

Ap—0 to 10 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong medium subangular blocky structure; very hard, firm, sticky and plastic; many fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—10 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong medium subangular blocky structure; very hard, firm, sticky and plastic; many fine and very fine roots; strongly effervescent; moderately alkaline; clear wavy boundary.

Bky—18 to 35 inches; dark grayish brown (2.5Y 4/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist; weak fine and medium subangular blocky structure; very hard, firm, sticky and plastic; few fine and very fine roots; few fine irregular masses of lime and gypsum; 15 percent soft shale fragments; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—35 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or above
Rock fragments: 0 to 15 percent hard shale fragments
Depth to Cr horizon: 20 to 40 inches
Depth to secondary lime: 11 to 27 inches

Ap horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 35 to 45 percent
Coarse fragments: 0 to 15 percent pebbles
Reaction: pH 6.6 to 7.8

Bw horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: silty clay loam, clay loam, or silty clay
Clay content: 35 to 45 percent
Coarse fragments: 0 to 15 percent hard pebbles, 0 to 15 percent soft pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 1 to 15 percent
Reaction: pH 7.4 to 8.4

Bky horizon
Hue: 2.5Y or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3

Texture: silty clay loam, clay loam, or silty clay
Clay content: 35 to 45 percent
Coarse fragments: 0 to 15 percent hard pebbles, 0 to 15 percent soft pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 15 percent
Gypsum: 1 to 5 percent
Reaction: pH 7.4 to 8.4

68C—Megonot-Yawdim silty clay loams, 4 to 15 percent slopes

Setting

Landform:
  Megonot—Sedimentary plains and hills
  Yawdim—Sedimentary plains and hills
Position on landform:
  Megonot—Backslopes, footslopes, and side slopes
  Yawdim—Backslopes and side slopes
Slope:
  Megonot—4 to 15 percent
  Yawdim—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Megonot and similar soils: 45 percent
Yawdim and similar soils: 40 percent

Minor Components

Abor and similar soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent

Major Component Description

Megonot

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Musselshell Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Coarse-loamy, carbonatic, frigid Haplocalcidic Ustochrepts

Typical Pedon

Musselshell loam, in an area of Crago-Musselshell-Attewan complex, 0 to 2 percent slopes, 1,100 feet north and 500 feet west of the southeast corner of sec. 19, T. 10 N., R. 24 E.

A—0 to 4 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable, nonsticky and slightly plastic; many fine roots; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk1—4 to 10 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; many fine roots; many fine and very fine irregular masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—10 to 20 inches; white (10YR 8/1) loam, light gray (10YR 7/1) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots; many fine irregular masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.

2C—20 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; 5 percent cobbles, 45 percent pebbles; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F
Moisture control section: 8 to 24 inches, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is higher than 41 degrees F

A horizon
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Clay content: 20 to 27 percent
Rock fragments: 0 to 20 percent cobbles, 0 to 15 percent pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Bk horizons
Hue: 10YR or 2.5Y
Value: 6, 7, or 8 dry; 4, 5, 6, or 7 moist
Chroma: 1, 2, 3, or 4
Texture: loam or silt loam
Clay content: 10 to 27 percent
Rock fragments: 0 to 35 percent; 0 to 10 percent cobbles, 0 to 25 percent pebbles
Calcium carbonate equivalent: 40 to 60 percent
Reaction: pH 7.9 to 9.0

2C horizon
Hue: 10YR or 2.5Y
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: fine sandy loam, sandy loam, or loam
Clay content: 10 to 18 percent
Rock fragments: 35 to 60 percent; 5 to 10 percent cobbles, 30 to 50 percent pebbles
Calcium carbonate equivalent: 40 to 60 percent
Reaction: pH 7.9 to 9.0

97A—Musselshell-Crago cobbly loams, 0 to 4 percent slopes

Setting

Landform:
Musselshell—Relict stream terraces
Crago—Relict stream terraces
Slope:
Musselshell—0 to 4 percent
Crago—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Musselshell and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Attewan and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent
Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Musselshell

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.4 inches

Crago

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

97B—Musselshell-Crago complex, 4 to 8 percent slopes

Setting

Landform:
Musselshell—Relict stream terraces
Crago—Relict stream terraces
Slope:
Musselshell—4 to 8 percent
Crago—4 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Musselshell and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Attewan and similar soils: 0 to 5 percent
Verson and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent

Major Component Description

Musselshell

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.5 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Neldore Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated shale residuum
Slope range: 2 to 45 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey, smectitic, nonacid, frigid, shallow Aridic Ustorthents

Typical Pedon

Neldore silty clay, in an area of Neldore-Abor silty clays, 4 to 15 percent slopes, 1,600 feet south and 1,400 west of the northeast corner of sec. 17, T. 11 N., R. 31 E.

A—0 to 3 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure parting to weak fine granular; hard, firm, sticky and plastic; common fine and very fine roots; slightly alkaline; clear smooth boundary.

C1—3 to 6 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; massive; hard, firm, sticky and plastic; common fine and very fine roots; approximately 5 percent soft shale fragments; slightly alkaline; gradual wavy boundary.

C2—6 to 14 inches; grayish brown (10YR 5/2) silty clay, dark grayish brown (10YR 4/2) moist; massive; hard, firm, sticky and plastic; few fine and very fine roots; approximately 65 percent soft shale fragments; moderately acid; diffuse wavy boundary.

Cr—14 to 60 inches; gray (10YR 5/1) semiconsolidated shale.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or above
Depth to Cr horizon: 10 to 20 inches
Soil phases: saline

A horizon
- Hue: 10YR, 2.5Y, or 5Y
- Value: 4, 5, or 6 dry; 3, 4, or 5 moist
- Chroma: 1 or 2
- Clay content: 40 to 60 percent
- Electrical conductivity: 0 to 4 mmhos/cm; saline phase is 2 to 4 mmhos/cm
- Reaction: pH 5.6 to 8.4

C1 horizon
- Hue: 10YR, 2.5Y, or 5Y
- Value: 5 or 6 dry; 4 or 5 moist
- Chroma: 1 or 2
- Texture: clay or silty clay
- Clay content: 40 to 60 percent
- Rock fragments: 5 to 35 percent—5 to 25 percent soft shale fragments, 0 to 10 percent hard shale fragments
- Electrical conductivity: 0 to 8 mmhos/cm; saline phase is 4 to 8 mmhos/cm
- Reaction: pH 5.6 to 8.4; saline phase pH 7.4 to 8.4

C2 horizon
- Hue: 10YR, 2.5Y, or 5Y
- Value: 5 or 6 dry; 4 or 5 moist
- Chroma: 1 or 2
- Texture: clay or silty clay
- Clay content: 40 to 60 percent
- Rock fragments: 65 to 90 percent shale fragments—65 to 75 percent soft shale fragments, 0 to 15 percent hard shale fragments
- Electrical conductivity: 0 to 8 mmhos/cm; saline phase is 4 to 8 mmhos/cm
- Gypsum: 1 to 3 percent
- Reaction: pH 5.6 to 8.4; saline phase pH 7.4 to 8.4

62C—Neldore silty clay, 4 to 25 percent slopes

Setting

Landform: Sedimentary plains and hills
Slope: 4 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Neldore and similar soils: 85 percent

Minor Components

Abor and similar soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent
Neldore, saline soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

60E—Neldore-Abor silty clays, 15 to 45 percent slopes

Setting

Landform: Uplands
Slope: 15 to 45 percent
Elevation: 1,900 to 4,500 feet
Mean annual precipitation: 12 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components
Neldore and similar soils: 55 percent
Abor and similar soils: 30 percent

Minor Components

Rock outcrop and similar soils: 5 percent
Very shallow soils and similar soils: 5 percent
Weingart and similar soils: 5 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Dominant parent material: Consolidated shale residuum
Drainage class: Well drained

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.1 inches

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

60D—Neldore-Abor silty clays, 4 to 15 percent slopes

Setting

Landform:
  Neldore—Sedimentary plains and hills
  Abor—Sedimentary plains and hills
Position on landform:
  Neldore—Shoulders and summits
  Abor—Backslopes, footslopes, and side slopes
Slope:
  Neldore—4 to 15 percent
  Abor—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Neldore and similar soils: 50 percent
Abor and similar soils: 40 percent

Minor Components

Neldore, saline soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.0 inches

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

61D—Neldore-Neldore, saline silty clays, 4 to 25 percent slopes

Setting

Landform:
  Neldore—Sedimentary plains and hills
  Neldore, saline—Sedimentary plains and hills
Slope:
  Neldore—4 to 25 percent
  Neldore, saline—4 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Neldore and similar soils: 50 percent
Neldore, saline and similar soils: 40 percent

Minor Components

Abor and similar soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.6 inches

Neldore, saline

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

62E—Neldore-Rock outcrop complex, 15 to 45 percent slopes

Setting

Landform: Hills
Position on landform:
Neldore—Backslopes and side slopes
Rock outcrop—Shoulders and summits
Slope: 15 to 45 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Neldore and similar soils: 60 percent
Rock outcrop: 30 percent

Minor Components

Abor and similar soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.6 inches

Rock outcrop

Definition: Areas of exposed shale bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

61E—Neldore-Volborg silty clays, 4 to 25 percent slopes

Setting

Landform:
Neldore—Sedimentary plains and hills
Volborg—Sedimentary plains and hills
Position on landform:
Neldore—Backslopes, footslopes, and side slopes
Volborg—Backslopes and side slopes
Slope:
Neldore—4 to 25 percent
Volborg—4 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Neldore and similar soils: 50 percent
Volborg and similar soils: 40 percent

Minor Components

Abor and similar soils: 0 to 5 percent
Neldore, saline soils: 0 to 5 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.6 inches

Volborg

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

62D—Neldore-Yawdim silty clays, 4 to 25 percent slopes

Setting

Landform:
Neldore—Sedimentary plains and hills
Yawdim—Sedimentary plains and hills
Slope:
Neldore—4 to 25 percent
Yawdim—4 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Neldore and similar soils: 45 percent
Yawdim and similar soils: 40 percent

Minor Components

Abor and similar soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent
Neldore, saline soils: 0 to 5 percent

Major Component Description

Neldore

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.6 inches

Yawdim

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Niart Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, carbonatic Aridic Calciborolls

Typical Pedon

Niart loam, in an area of Attewan-Niart loams, 0 to 4 percent slopes, 1,500 feet south and 1,100 feet west of the northeast corner of sec. 15, T. 10 N., R. 22 E.

Ap1—0 to 2 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; 5 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Ap2—2 to 6 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; 5 percent pebbles; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Bk1—6 to 17 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; weak medium prismatic structure parting to weak fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; 5 percent pebbles; disseminated lime; common fine masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—17 to 24 inches; white (10YR 8/2) gravelly clay loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; 25 percent pebbles; common distinct lime casts on rock fragments; disseminated lime; violently effervescent; moderately alkaline; gradual wavy boundary.

2Bk3—24 to 34 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; loose, nonsticky and nonplastic; 5 percent cobbles, 45 percent pebbles; common distinct lime casts on rock fragments; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; diffuse wavy boundary.

2C—34 to 60 inches; very pale brown (10YR 7/3) extremely gravelly loam, pale brown (10YR 6/3) moist; massive; loose, nonsticky and nonplastic; 5 percent cobbles, 70 percent pebbles; common distinct lime casts on rock fragments; disseminated lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: moist in some part in most years more than half the time from April through October.
Mollic epipedon thickness: 7 to 10 inches
Depth to Bk1 horizon: 6 to 17 inches
Depth to 2Bk3 horizon: 19 to 40 inches

Ap horizons
Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 3 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 5 to 45 percent—0 to 5 percent cobbles, 5 to 40 percent pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Bk1 and Bk2 horizons
Hue: 10YR or 2.5Y
Value: 6, 7, or 8 dry; 5, 6, or 7 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 20 to 30 percent
Rock fragments: 5 to 30 percent—0 to 5 percent cobbles, 5 to 25 percent pebbles
Calcium carbonate equivalent: 40 to 55 percent
Reaction: pH 7.9 to 9.0

2Bk3 and 2C horizons
Hue: 10YR or 2.5Y
Value: 6, 7, or 8 dry; 5, 6, or 7 moist
Chroma: 2, 3, or 4
Texture: loam, sandy clay loam, or sandy loam
Clay content: 15 to 30 percent
Rock fragments: 35 to 80 percent—5 to 10 percent cobbles, 30 to 70 percent pebbles
Calcium carbonate equivalent: 40 to 55 percent
Reaction: pH 7.9 to 9.0

98A—Niart cobbly loam, 0 to 4 percent slopes

Setting

Landform: Relict stream terraces
Slope: 0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Niart and similar soils: 85 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent

Crago and similar soils: 0 to 5 percent
Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

98B—Niart-Crago complex, 0 to 4 percent slopes

Setting

Landform:
Niart—Relict stream terraces
Crago—Relict stream terraces
Slope:
Niart—0 to 4 percent
Crago—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Niart and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Rothiemay and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent

Major Component Description

Niart

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.8 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

98C—Niart-Crago complex, 4 to 15 percent slopes

Setting

Landform:
Niart—Relict stream terraces
Crago—Relict stream terraces
Slope:
Niart—4 to 15 percent
Crago—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Niart and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Rothiemay and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent

Major Component Description

Niart

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 6.8 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

98D—Niart-Rothiemay loams, 0 to 4 percent slopes

Setting

Landform:
  Niart—Relict stream terraces
  Rothiemay—Alluvial fans and stream terraces
Slope:
  Niart—0 to 4 percent
  Rothiemay—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Niart and similar soils: 45 percent
Rothiemay and similar soils: 40 percent

Minor Components

Crago and similar soils: 0 to 5 percent
Tetonview and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent

Major Component Description

Niart

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.8 inches

Rothiemay

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Nobe Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Moderately well drained
Permeability: Very slow (less than 0.06 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, calcareous, frigid Vertic Ustorthents

Typical Pedon

Nobe silty clay loam, in an area of Nobe-Absher complex, 0 to 4 percent slopes, 2,100 feet north and 2,400 feet west of the southeast corner of sec. 11, T. 9 N., R. 24 E.

E—0 to 1 inches; light gray (10YR 7/2) silty clay loam, grayish brown (10YR 5/2) moist; weak fine granular structure with a thin (1/4 inch thick) vesicular crust; hard, firm, sticky and plastic; few fine and very fine roots; strongly effervescent; moderately alkaline; clear smooth boundary.

By—1 to 18 inches; light brownish gray (10YR 6/2) silty clay, dark grayish brown (10YR 4/2) moist; granular structure (flocculation caused by soluble salts); very hard, friable, sticky and plastic; few fine and very fine roots; common fine irregular masses and seams of gypsum; strongly effervescent; moderately alkaline; clear smooth boundary.

Byz1—18 to 32 inches; light brownish gray (10YR 6/2) silty clay, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; very hard, firm, very sticky and very plastic; common fine irregular masses and seams of gypsum and other salts; strongly effervescent; strongly alkaline; diffuse wavy boundary.

Byz2—32 to 60 inches; light brownish gray (10YR 6/2) silty clay, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; very hard, firm, very sticky and very plastic; few fine irregular masses of gypsum and common fine irregular masses and seams of salts; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 to 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F
Depth to saturated zone: 24 to 42 inches for 1 to 4 months in the spring. The soil is moist below 42 inches when not saturated or frozen.

E horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Clay content: 27 to 40 percent
Electrical conductivity: 4 to 8 mmhos/cm
Sodium adsorption ratio: 10 to 15
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 6.6 to 8.4

By and Byz1 horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: clay, silty clay, or silty clay loam
Clay content: 35 to 60 percent
Electrical conductivity: 16 to 32 mmhos/cm
Gypsum: 2 to 5 percent
Sodium adsorption ratio: 15 to 40 percent
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.9 to 9.6

Byz2 horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: clay, silty clay, or silty clay loam
Clay content: 35 to 60 percent
Electrical conductivity: 16 to 32 mmhos/cm
Gypsum: 2 to 5 percent
Sodium adsorption ratio: 15 to 70
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.9 to 9.6

22B—Nobe-Absher complex, 0 to 4 percent slopes

Setting

Landform:
Nobe—Alluvial fans and stream terraces
Absher—Alluvial fans and stream terraces
Position on landform:
Nobe—Microhighs
Absher—Microlows
Slope:
Nobe—0 to 4 percent
Absher—0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Nobe and similar soils: 45 percent
Absher and similar soils: 40 percent

Minor Components

Vanda and similar soils: 0 to 5 percent
Gerdrum and similar soils: 0 to 5 percent
McKenzie and similar soils: 0 to 5 percent

Major Component Description

Nobe

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 4.0 inches

Absher

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained

Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Orinoco Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated shale residuum
Slope range: 2 to 35 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, calcareous, frigid Vertic Ustorthents

Typical Pedon

Orinoco silty clay loam, in an area of Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes, 2,000 feet north and 1,200 feet west of the southeast corner of sec. 1, T. 11 N., R. 25 E.

A—0 to 3 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong fine granular structure; hard, friable, sticky and plastic; many fine and very fine roots; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bw—3 to 7 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine roots; few fine irregular seams and masses of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bky—7 to 16 inches; light brownish gray (10YR 6/2) silty clay loam, grayish brown (10YR 5/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; hard, friable, sticky and plastic; common fine and very fine roots; few fine irregular seams and masses of lime and gypsum; strongly effervescent; moderately alkaline; clear smooth boundary.

BC—16 to 24 inches; light brownish gray (10YR 6/2) silty clay loam, grayish brown (10YR 5/2) moist; massive; hard, friable, sticky and plastic; common fine and very fine roots; slightly effervescent; moderately alkaline; abrupt smooth boundary.

Cr—24 to 60 inches; light brownish gray (10YR 6/2) semiconsolidated shale.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when soil temperature at 20 inches is 41 degrees F
Depth to bedrock: 20 to 40 inches
Depth to Bky horizon: 6 to 10 inches

A horizon
Value: 5 or 6 dry; 4 or 5 moist
Clay content: 30 to 40 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Bw horizon
Value: 5 or 6 dry; 4 or 5 moist
Texture: silty clay loam or silty clay
Clay content: 35 to 45 percent
Electrical conductivity: 4 to 8 mmhos/cm
Sodium adsorption ratio: 5 to 15
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 8.4

Bky horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 1 or 2
Texture: silty clay loam, clay, or silty clay
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 4 to 8 mmhos/cm
Sodium adsorption ratio: 5 to 15
Calcium carbonate equivalent: 5 to 15 percent
Gypsum: 1 to 5 percent
Reaction: pH 7.9 to 8.4

BC horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 3, 4, or 5 moist

Chroma: 1 or 2
Texture: silty clay loam, clay, or silty clay
Clay content: 35 to 45 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 15 to 30
Gypsum: 1 to 5 percent
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 6.6 to 8.4

69C—Orinoco-Yawdim silty clay loams, 4 to 15 percent slopes

Setting

Landform:
Orinoco—Sedimentary plains and hills
Yawdim—Sedimentary plains and hills
Position on landform:
Orinoco—Backslopes, footslopes, and side slopes
Yawdim—Backslopes and side slopes
Slope:
Orinoco—4 to 15 percent
Yawdim—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Orinoco and similar soils: 45 percent
Yawdim and similar soils: 40 percent

Minor Components

Neldore and similar soils: 0 to 5 percent
Abor and similar soils: 0 to 5 percent
Weingart and similar soils: 0 to 5 percent

Major Component Description

Orinoco

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.1 inches

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Rentsac Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Bedrock floored plains, sedimentary plains, and hills
Parent material: Sandstone residuum
Slope range: 2 to 45 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, calcareous, frigid Lithic Ustorthents

Typical Pedon

Rentsac fine sandy loam, 2 to 8 percent slopes, 1,400 feet east and 10 feet south of the northwest corner of sec. 31, T. 11 N., R. 25 E.

A—0 to 2 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; 10 percent sandstone channers; neutral; clear smooth boundary.

Bk1—2 to 7 inches; light brownish gray (10YR 6/3) channery loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 25 percent sandstone channers; disseminated lime; few distinct lime casts on coarse fragments; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk2—7 to 12 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 55 percent channers and 10 percent flagstones; disseminated lime; common distinct lime casts on the undersides of coarse fragments; strongly effervescent; slightly alkaline; clear smooth boundary.

R—12 inches; brown (10YR 5/3) hard sandstone.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 8 inches and the lithic contact, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher
Depth to bedrock: 10 to 20 inches

A horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 5 or 6 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Clay content: 7 to 18 percent
Rock fragments: 0 to 15 percent pebbles and channers
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 6.6 to 8.4

Bk1 horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loam, sandy loam, or fine sandy loam
Clay content: 7 to 18 percent
Rock fragments: 0 to 80 percent—0 to 45 percent stones and flagstones; 0 to 55 percent pebbles and channers
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

Bk2 horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, 4, or 6
Texture: loam or sandy loam
Clay content: 7 to 18 percent
Rock fragments: 35 to 70 percent—0 to 35 percent cobbles and flagstones; 25 to 55 percent pebbles and channers
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 0 to 4 mmhos/cm
Reaction: pH 7.4 to 8.4

89C—Rentsac fine sandy loam, 2 to 8 percent slopes

Setting

Landform: Bedrock-floored plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Rentsac and similar soils: 85 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Fine sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

189C—Rentsac-Cabbart complex, 2 to 15 percent slopes

Setting

Landform:
Rentsac—Sedimentary plains and hills
Cabbart—Sedimentary plains and hills
Slope:
Rentsac—2 to 15 percent
Cabbart—2 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Rentsac and similar soils: 45 percent
Cabbart and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Rentsac

Surface layer texture: Fine sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.0 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

189E—Rentsac-Rock outcrop complex, 15 to 45 percent slopes

Setting

Landform: Hills
Position on landform:
  Rentsac—Backslopes and side slopes
  Rock outcrop—Shoulders and summits
Slope: 15 to 45 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Rentsac and similar soils: 60 percent
Rock outcrop: 25 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Rentsac

Surface layer texture: Fine sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.0 inches

Rock outcrop

Definition: Areas of exposed sandstone bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Ridge Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Hills and sedimentary plains
Parent material: Semiconsolidated sandy sedimentary beds
Slope range: 4 to 45 percent
Elevation range: 3,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy, mixed, superactive, frigid, shallow Typic Ustochrepts

Typical Pedon

Ridge sandy loam, in an area of Ridge-Dast sandy loams, 8 to 45 percent slopes, 500 feet east and

1,200 feet north of the southwest corner of sec. 22, T. 8 N., R. 27 E.

A—0 to 4 inches; grayish brown (10YR 5/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to single grain; slightly hard, loose, nonsticky and nonplastic; many fine and very fine and few medium roots; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—4 to 12 inches; light brownish gray (10YR 6/2) sandy loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine and few medium roots; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk—12 to 16 inches; light brownish gray (10YR 6/2) sandy loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; soft, loose, nonsticky and nonplastic; many fine and very fine and few medium roots; 10 percent pebbles; common distinct lime casts on undersides of rock fragments; disseminated lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—16 to 60 inches; semiconsolidated sandy sedimentary beds.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: 8 to 16 inches
Depth to Bk horizon: 10 to 16 inches
Depth to Cr horizon: 12 to 20 inches

A horizon
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Clay content: 5 to 20 percent
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 7.4 to 7.8

Bw horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: sandy loam or loam
Clay content: 5 to 20 percent
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Bk horizon
Hue: 10YR to 5Y
Value: 6 or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: sandy loam or loam
Clay content: 5 to 20 percent
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

242F—Ridge-Dast sandy loams, 8 to 45 percent slopes

Setting

Landform:
Ridge—Hills
Dast—Hills
Position on landform:
Ridge—Backslopes and side slopes
Dast—Backslopes, footslopes, and side slopes
Slope:
Ridge—15 to 45 percent
Dast—8 to 25 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Ridge and similar soils: 45 percent
Dast and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Cabba and similar soils: 0 to 5 percent
Doney and similar soils: 0 to 5 percent

Major Component Description

Ridge

Surface layer texture: Sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.2 inches

Dast

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained

Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

240E—Ridge-Dast-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform:
  Ridge—Sedimentary plains and hills
  Dast—Sedimentary plains and hills
Position on landform:
  Ridge—Backslopes, footslopes, and side slopes
  Dast—Backslopes, footslopes, and side slopes
  Rock outcrop—Shoulders and summits
Slope:
  Ridge—4 to 15 percent
  Dast—4 to 35 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Ridge and similar soils: 35 percent
Dast and similar soils: 30 percent
Rock outcrop: 20 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Doney and similar soils: 0 to 5 percent
Wayden and similar soils: 0 to 5 percent

Major Component Description

Ridge

Surface layer texture: Sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.2 inches

Dast

Surface layer texture: Fine sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Rock outcrop

Definition: Areas of exposed sandstone bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Ringling Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Excessively drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour) above the fragmental material and rapid (6.0 to 20.0 inches/hour) in the fragmental material
Landform: Hills and sedimentary plains
Parent material: Scoria residuum
Slope range: 2 to 45 percent
Elevation range: 4,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Loamy-skeletal over fragmental, mixed, superactive Typic Haploborolls

Typical Pedon

Ringling channery loam, in an area of Lamedeer-Ringling channery loams, 2 to 8 percent slopes, 1,600 feet west and 2,650 north of the southeast corner of sec. 32, T. 8 N., R. 27 E.

A—0 to 5 inches; reddish brown (5YR 4/3) channery loam, dark reddish brown (5YR 3/3) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 30 percent channers; neutral; clear smooth boundary.

Bw—5 to 14 inches; reddish brown (5YR 4/4) very channery loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; hard, very friable; slightly sticky and slightly plastic; many very fine roots; 5 percent flagstones, 35 percent channers; slightly alkaline; clear smooth boundary.

Bk—14 to 20 inches; reddish brown (5YR 5/3) very channery loam, reddish brown (5YR 4/3) moist; weak very fine granular structure; soft, loose, slightly sticky and slightly plastic; common very fine roots; 50 percent channers and 5 percent flagstones; common distinct lime casts on coarse fragments; disseminated lime; strongly effervescent; slightly alkaline; clear smooth boundary.

2Ck—20 to 39 inches; light red (10R 6/8) highly fractured baked sandstone and shale with less than 5 percent fine material in the voids; few very fine roots along faces of fragments; common distinct lime casts on coarse fragments; violently effervescent; moderately alkaline; gradual smooth boundary.

3C—39 to 60 inches; pink (5YR 7/3) highly fractured baked sandstone and shale; less than 3 percent fine material in the voids; few very fine roots along faces of fragments; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Moisture control section: between 8 and 24 inches
Mollic epipedon thickness: 7 to 14 inches
Depth to fragmental material: 12 to 20 inches

A horizon
Hue: 7.5YR, 5YR, 2.5YR, or 10R
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 10 to 25 percent
Rock fragments: 15 to 35 percent—0 to 5 percent flagstones, 15 to 30 percent channers
Reaction: pH 6.6 to 7.8

Bw horizon
Hue: 7.5YR, 5YR, 2.5YR, or 10R
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Clay content: 10 to 25 percent
Rock fragments: 35 to 80 percent—5 to 25 percent flagstones, 30 to 55 percent channers
Reaction: pH 6.6 to 7.8

Bk horizon
Hue: 7.5YR, 5YR, 2.5YR, or 10R
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Clay content: 10 to 25 percent
Rock fragments: 35 to 80 percent—5 to 25 percent flagstones, 30 to 55 percent channers
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 6.6 to 7.8

2Ck horizon
Clay content: 0 to 5 percent
Rock fragments: 95 to 100 percent—90 to 95 percent flagstones, 5 to 10 percent channers
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 6.6 to 8.4

3C horizon
Clay content: 0 to 5 percent
Rock fragments: 95 to 100 percent—90 to 95 percent flagstones, 5 to 10 percent channers and shale
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 6.6 to 8.4

3A—Riverwash

Setting

Landform: Flood plains
Slope: 0 to 1 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Riverwash: 85 percent

Minor Components

Glendive and similar soils: 0 to 7 percent
Havre and similar soils: 0 to 5 percent
Bigsandy and similar soils: 0 to 3 percent

Major Component Description

Definition: Unstabilized areas of sandy, silty, clayey, or gravelly sediments

2E—Rock outcrop

Composition

Major Components

Rock outcrop: 85 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Cambert and similar soils: 0 to 10 percent

Major Component Description

Definition: Areas of exposed bedrock

Rothiemay Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inches/hour)
Landform: Alluvial fans and relict stream terraces
Parent material: Alluvium
Slope range: 0 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive Aridic Calciborolls

Typical Pedon

Rothiemay loam in an area of Rothiemay-Crago complex, 4 to 15 percent slopes, 300 feet east and 1,900 feet north of the southwest corner of sec. 12, T. 11 N., R. 24 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to strong very fine subangular blocky; slightly hard, very friable, sticky and slightly plastic; common fine and very fine roots; slightly alkaline; abrupt smooth boundary.

Bw—6 to 15 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, friable, sticky and slightly plastic; common fine and very fine roots; slightly effervescent; slightly alkaline; clear wavy boundary.

Bk1—15 to 25 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; strong coarse subangular blocky structure; hard, friable, sticky and slightly plastic; common fine and very fine roots; few fine irregular masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk2—26 to 36 inches; light gray (10YR 7/2) sandy clay loam, light brownish gray (10YR 6/2) moist; moderate coarse subangular blocky structure; hard, friable, sticky and plastic; few fine roots; 10 percent pebbles; continuous fine lime coatings on pebbles; many fine irregular masses of lime; violently effervescent; strongly alkaline; gradual wavy boundary.

Bk3—36 to 60 inches; light gray (10YR 7/2) sandy clay loam, light brownish gray (10YR 6/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots; 10 percent pebbles; continuous fine lime coatings on pebbles; many fine irregular soft masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches, dry in some part for six-tenths or more of the cumulative days per year when the soil temperature at a depth of 20 inches is higher than 41 degrees F
Mollic epipedon thickness: 7 to 10 inches
Depth to calcic horizon: 13 to 20 inches

Ap horizon
Hue: 10YR or 2.5Y
Chroma: 1 or 2
Clay content: 15 to 27 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Calcium carbonate equivalent: 1 to 10 percent
Reaction: pH 7.4 to 8.4

Bw horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: loam or clay loam
Clay content: 18 to 35 percent with less than 35 percent fine and coarser sand
Rock fragments: 0 to 35 percent—0 to 5 percent cobbles, 0 to 30 percent pebbles
Calcium carbonate equivalent: 5 to 20 percent
Reaction: pH 7.4 to 8.4

Bk1, Bk2 horizon
Hue: 10YR or 2.5Y

Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: loam, clay loam, or sandy clay loam
Clay content: 18 to 35 percent with less than 35 percent fine and coarser sand
Rock fragments: 0 to 35 percent—0 to 5 percent cobbles, 0 to 30 percent pebbles
Calcium carbonate equivalent: 15 to 40 percent
Reaction: pH 7.9 to 9.0

Bk3 horizon
Hue: 10YR or 2.5Y
Value: 6, 7, or 8 dry; 5, 6, or 7 moist
Chroma: 2 or 3
Texture: loam, clay loam, or sandy clay loam
Clay content: 18 to 35 percent with less than 35 percent fine and coarser sand
Rock fragments: 5 to 35 percent
Calcium carbonate equivalent: 15 to 60 percent
Reaction: pH 7.9 to 9.0

142A—Rothiemay loam, calcareous, 0 to 2 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Rothiemay, calcareous and similar soils: 85 percent

Minor Components

Niart and similar soils: 0 to 5 percent
Binna and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

142B—Rothiemay loam, calcareous, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Rothiemay and similar soils: 85 percent

Minor Components

Niart and similar soils: 0 to 5 percent
Binna and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

142C—Rothiemay-Crago complex, 4 to 15 percent slopes

Setting

Landform:
Rothiemay—Alluvial fans and stream terraces
Crago—Relict stream terraces
Slope:
Rothiemay—4 to 15 percent
Crago—4 to 15 percent

Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Rothiemay and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Niart and similar soils: 0 to 5 percent
Binna and similar soils: 0 to 5 percent

Major Component Description

Rothiemay

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Savage Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans, stream terraces
Parent material: Alluvium
Slope range: 2 to 8 percent
Elevation range: 3,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine, smectitic Vertic Argiborolls

Typical Pedon

Savage loam, 2 to 8 percent slopes, 180 feet south and 50 feet west of the northeast corner of sec. 4, T. 11 N., R. 22 E.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly alkaline; clear smooth boundary.

Bt—5 to 17 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; very hard, firm, very sticky and very plastic; many fine and very fine roots; continuous faint clay films on faces of peds; slightly alkaline; clear wavy boundary.

Btk—17 to 24 inches; pale brown (10YR 6/3) silty clay, brown (10YR 4/3) moist; strong coarse subangular blocky structure parting to moderate medium subangular blocky; very hard, firm, very sticky and very plastic; common fine and very fine roots; continuous faint clay films on faces of peds; few fine irregular masses of lime; slightly alkaline; slightly effervescent; clear wavy boundary.

Bk1—24 to 35 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; common fine roots; many fine and medium irregular masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—35 to 60 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; very hard, friable, sticky and plastic; few fine roots; common fine and medium irregular masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 16 inches (may include part or all of the argillic horizon)
Depth to Bk horizon: 12 to 30 inches

A horizon

Hue: 10YR or 2.5Y
Value: 3, 4, or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 18 to 27 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.1 to 7.8

Bt horizon

Hue: 10YR or 2.5Y
Value: 3, 4, or 5 dry; 2, 3, or 4 moist
Chroma: 2, 3, or 4
Texture: silty clay loam or silty clay
Clay content: 35 to 50 percent
Rock fragments: 0 to 5 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Reaction: pH 6.1 to 8.4

Btk and Bk horizons

Hue: 10R or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: silty clay loam or silty clay
Clay content: 30 to 45 percent
Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Electrical conductivity: 0 to 4 mmhos/cm
Reaction: pH 7.4 to 8.4

251C—Savage loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Savage and similar soils: 90 percent

Minor Components

Regent and similar soils: 0 to 5 percent
Tamaneen and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Shambo Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 2 to 8 percent
Elevation range: 3,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive Typic Haploborolls

Typical Pedon

Shambo loam, 2 to 8 percent slopes, 500 feet south and 150 feet east of the northwest corner of sec. 34, T. 6 N., R. 25 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; slightly alkaline; abrupt smooth boundary.

Bw—7 to 16 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common fine and very fine and few medium roots; slightly alkaline; clear smooth boundary.

Bk1—16 to 26 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and very fine subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; disseminated lime; few fine masses of lime;

strongly effervescent; strongly alkaline; gradual wavy boundary.

Bk2—26 to 36 inches; light gray (2.5Y 7/2) loam, grayish brown (2.5Y 5/2) moist; weak medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; many fine and medium irregular masses of lime; violently effervescent; strongly alkaline; gradual wavy boundary.

C—36 to 60 inches; light gray (2.5Y 7/2) stratified loam and silt loam, grayish brown (2.5Y 5/2) moist; weak medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; disseminated lime; violently effervescent; strongly alkaline.

Range in Characteristics

Depth to Bk horizon: 10 to 35 inches
Mollic epipedon thickness: 7 to 16 inches

Ap horizon
Value: 3, 4, or 5; 2 or 3 moist
Chroma: 2 or 3
Clay content: 10 to 27 percent
Reaction: pH 6.6 to 7.8

Bw horizon
Hue: 10YR or 2.5Y
Value: 4, 5, or 6; 3 or 4 moist
Chroma: 2 to 4
Texture: loam, silt loam, or clay loam
Clay content: 18 to 35 percent
Reaction: pH 6.6 to 8.4

Bk horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7; 4, 5, or 6 moist
Chroma: 2 to 4
Texture: loam, clay loam, silty clay loam, or silt loam.
Clay content: 18 to 35 percent
Sodium adsorption ratio: 1 to 5
Calcium carbonate equivalent: 10 to 15 percent
Reaction: pH 7.4 to 9.0

C horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7; 4 to 6 moist
Chroma: 2 to 4
Texture: stratified loam and silt loam
Clay content: 18 to 27 percent
Sodium adsorption ratio: 1 to 5
Calcium carbonate equivalent: 10 to 15 percent
Reaction: pH 7.4 to 9.0

294C—Shambo loam, 2 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 2 to 8 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Shambo and similar soils: 90 percent

Minor Components

Straw and similar soils: 0 to 5 percent
Korchea and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

255C—Shambo-Korchea-Barvon loams, 2 to 8 percent slopes

Setting

Landform:
Shambo—Alluvial fans and stream terraces
Korchea—Flood plains
Barvon—Sedimentary plains
Slope:
Shambo—2 to 4 percent
Korchea—2 to 4 percent
Barvon—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Shambo and similar soils: 35 percent
Korchea and similar soils: 30 percent
Barvon and similar soils: 30 percent

Minor Components

Savage and similar soils: 0 to 5 percent

Major Component Description

Shambo

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.9 inches

Korchea

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 10.1 inches

Barvon

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Sinnigam Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Hills and bedrock floored plains
Parent material: Residuum
Slope range: 2 to 15 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey-skeletal, mixed, superactive Lithic Argiborolls

Typical Pedon

Sinnigam very stony clay loam, in an area of Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes, 650 feet west and 1,700 feet south of the northeast corner of sec. 7, T. 11 N., R. 22 E.

A—0 to 5 inches; grayish brown (10YR 5/2) very stony clay loam, very dark grayish brown (10YR 3/2) moist; strong very fine subangular blocky structure; slightly hard, very friable, sticky and plastic; many fine and very fine roots; 30 percent channers and cobbles, 20 percent stones; neutral; clear smooth boundary.

Bt1—5 to 12 inches; grayish brown (10YR 5/2) very stony clay loam, very dark grayish brown (10YR 3/2) moist; strong medium subangular blocky structure; very hard, friable, sticky and plastic; common very fine roots; many faint clay films on faces of peds; 40 percent channers and cobbles, 15 percent stones; neutral; clear smooth boundary.

Bt2—12 to 17 inches; grayish brown (10YR 5/2) very stony clay loam, dark grayish brown (10YR 4/2) moist; strong coarse subangular blocky structure; very hard, friable, sticky and plastic; common very fine roots; many faint clay films on faces of peds; 40 percent channers and cobbles, 15 percent stones; neutral; clear smooth boundary.

R—17 inches; hard fractured sandstone interbedded with shale.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches or between 4 inches and the lithic contact.
Mollic epipedon thickness: 7 to 12 inches
Depth to bedrock: 10 to 20 inches

A horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 27 to 35 percent

Rock fragments: 35 to 60 percent—10 to 25 percent stones and cobbles, 5 to 35 percent pebbles or channers
Reaction: pH 6.1 to 7.8

Bt1 horizon
Hue: 10YR, 7.5YR, or 5YR
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Texture: clay loam, clay, or silty clay
Clay content: 35 to 50 percent
Rock fragments: 35 to 70 percent—15 to 35 percent stones and cobbles, 20 to 70 percent pebbles or channers
Reaction: pH 6.1 to 7.8

Bt2 horizon
Hue: 10YR, 7.5YR, or 5YR
Value: 4 or 5 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: clay loam, clay, or silty clay
Clay content: 35 to 50 percent
Rock fragments: 35 to 70 percent—15 to 30 percent stones and cobbles, 20 to 70 percent pebbles or channers
Reaction: pH 6.1 to 7.8

Straw Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Stream terraces
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive Cumulic Haploborolls

Typical Pedon

Straw loam, in an area of Straw-Korchea loams, 0 to 2 percent slopes, 1,250 feet east and 1,600 feet north of the southwest corner of sec. 2, T. 11 N., R. 22 E.

A1—0 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.

A2—9 to 21 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear wavy boundary.

Bk—21 to 30 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; few medium irregular masses of lime; strongly effervescent; slightly alkaline; gradual wavy boundary.

C1—30 to 45 inches; light olive brown (2.5Y 5/4) loam, olive brown (2.5Y 4/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; few fine and very fine roots; common fine and medium irregular masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

2C2—45 to 60 inches; light yellowish brown (2.5Y 6/4) sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and very fine roots; common fine and medium irregular masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; not dry in all parts for 60 or more consecutive days following July 1
Mollic epipedon thickness: 16 to 40 inches
Depth to Bk horizon: 13 to 30 inches

A horizons
Hue: 10YR or 2.5Y
Value: 3 or 4 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 10 to 27 percent
Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 6.6 to 8.4

Bk horizon
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Texture: loam, silt loam, silty clay loam, or clay loam
Clay content: 18 to 32 percent

Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 3 to 15 percent
Reaction: pH 6.6 to 8.4

C1 horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loam, silt loam, or clay loam
Clay content: 18 to 32 percent
Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 3 to 15 percent
Reaction: pH 7.4 to 8.4

2C2 horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: stratified loam to loamy sand but mainly sandy loam or loamy sand
Clay content: 5 to 20 percent
Rock fragments: 0 to 10 percent pebbles
Calcium carbonate equivalent: 2 to 12 percent
Reaction: pH 7.4 to 8.4

292A—Straw-Korchea loams, 0 to 2 percent slopes

Setting

Landform:
Straw—Stream terraces
Korchea—Flood plains
Position on landform:
Straw—Footslopes
Korchea—Toeslopes
Slope:
Straw—0 to 2 percent
Korchea—0 to 2 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Straw and similar soils: 45 percent
Korchea and similar soils: 40 percent

Minor Components

Savage and similar soils: 0 to 5 percent
Shambo and similar soils: 0 to 5 percent
Macar and similar soils: 0 to 5 percent

Major Component Description

Straw

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 9.8 inches

Korchea

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 10.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Tanna Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated sedimentary beds
Slope range: 1 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic Aridic Argiborolls

Typical Pedon

Tanna loam, in an area of Tanna-Cabbart loams, 2 to 8 percent slopes, 1,400 feet south and 1,000 feet west of the northeast corner of sec. 26, T. 9 N., R. 26 E.

A—0 to 4 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; loose, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; clear smooth boundary.

Bt—4 to 12 inches; brown (10YR 4/3) silty clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; many fine and very fine roots; common faint clay films on faces of peds; slightly alkaline; gradual smooth boundary.

Bk1—12 to 17 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; disseminated lime; common fine masses of lime; slightly effervescent; slightly alkaline; diffuse wavy boundary.

Bk2—17 to 25 inches; pale yellow (2.5Y 7/4) loam, light yellowish brown (2.5Y 6/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; disseminated lime; common fine masses of lime; strongly effervescent; strongly alkaline; diffuse wavy boundary.

Cr—25 to 60 inches; light gray (2.5Y 7/2) semiconsolidated sedimentary beds.

Range in Characteristics

Soil temperature: 40 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 12 inches
Depth to Bk horizon: 10 to 20 inches
Depth to bedrock: 20 to 40 inches

Ap horizon
Hue: 10YR or 2.5Y
Value: 2 or 3 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 5 percent channers
Reaction: pH 6.6 to 7.8

Bt horizon
Hue: 10YR or 2.5Y
Value: 3 or 4 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam, clay, or silty clay
Clay content: 35 to 50 percent
Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 5 percent channers
Electrical conductivity: 0 to 4 mmhos/cm
Reaction: pH 6.6 to 8.4

Bk1 horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay loam or silty clay loam
Clay content: 35 to 40 percent
Rock fragments: 0 to 10 percent—0 to 5 percent cobbles, 0 to 5 percent channers
Electrical conductivity: 2 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 9.0

Bk2 horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 1, 2, 3, or 4
Texture: loam, clay loam, clay, or silty clay loam
Clay content: 15 to 40 percent
Rock fragments: 0 to 60 percent—0 to 5 percent cobbles, 10 to 55 percent channers
Electrical conductivity: 2 to 4 mmhos/cm
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 9.0

53A—Tanna loam, 1 to 6 percent slopes

Setting

Landform: Sedimentary plains
Slope: 1 to 6 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Tanna and similar soils: 85 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Ethridge and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

153C—Tanna-Cabbart loams, 2 to 8 percent slopes

Setting

Landform:
  Tanna—Sedimentary plains
  Cabbart—Sedimentary plains
Position on landform:
  Tanna—Backslopes, footslopes, and side slopes
  Cabbart—Shoulders and summits
Slope:
  Tanna—2 to 8 percent
  Cabbart—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Tanna and similar soils: 45 percent
Cabbart and similar soils: 40 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Megonot and similar soils: 0 to 5 percent
Welter and similar soils: 0 to 5 percent

Major Component Description

Tanna

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.3 inches

Cabbart

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Tibs Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Mountains
Parent material: Colluvium
Slope range: 2 to 60 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Taxonomic Class: Clayey-skeletal, mixed, superactive, calcareous, frigid Typic Ustorthents

Typical Pedon

Tibs cobbly clay loam, in an area of Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes, located in Fergus County, Mt., 1,320 feet west and 1,830 feet north of the southeast corner of sec. 7, T. 12 N., R. 21 E.

A1—0 to 2 inches; reddish brown (5YR 4/3) cobbly clay loam, dark reddish brown (5YR 3/3) moist; strong fine granular structure; soft, very friable, sticky and plastic; many fine, medium, and coarse roots; 20 percent angular cobbles, 10 percent angular pebbles; slightly effervescent; slightly alkaline; abrupt wavy boundary.

A2—2 to 6 inches; reddish brown (2.5YR 4/4) cobbly heavy clay loam, dark reddish brown (2.5YR 3/4) moist; weak fine subangular blocky structure; slightly hard, friable, sticky and plastic; many fine, medium, and coarse roots; 25 percent angular cobbles, 10 percent angular pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

Ck—6 to 12 inches; reddish brown (5YR 4/4) very cobbly clay loam, dark reddish brown (5YR 3/4) moist; strong fine subangular blocky structure; slightly hard, friable, sticky and plastic; many fine, medium, and coarse roots; 25 percent angular cobbles, 15 percent angular pebbles; common fine masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

C1—12 to 30 inches; reddish brown (2.5YR 5/4) very cobbly clay, reddish brown (2.5YR 4/4) moist; strong fine angular blocky structure; hard, friable, sticky and plastic; many fine, medium, and coarse roots in upper part; common fine, medium, and coarse roots in the lower part; 30 percent angular cobbles, 20 percent angular pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

C2—30 to 60 inches; red (2.5YR 5/6) very cobbly clay, red (2.5YR 4/6) moist; moderate fine subangular blocky structure; hard, friable, very sticky and very plastic; common fine, medium, and coarse roots; 35 percent angular cobbles, 20 percent angular pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 45 degrees F
Moisture control section: between 4 and 12 inches
Depth to k horizon: 5 to 9 inches

A1 horizon
Hue: 2.5YR through 10YR
Value: 3 or 4 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 30 to 40 percent
Rock fragments: 15 to 35 percent—10 to 25 percent angular cobbles; 5 to 10 percent angular pebbles
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 6.1 to 8.4

A2 horizon
Hue: 2.5YR through 10YR
Value: 4 or 5 dry; 3 or 4 moist
Clay content: 30 to 40 percent
Rock fragments: 5 to 35 percent—0 to 25 percent angular cobbles; 5 to 10 percent angular pebbles
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 6.1 to 8.4

Ck horizon
Hue: 2.5YR through 10YR
Value: 4, 5, or 6 dry; 3 or 4 moist
Texture: clay loam or clay
Clay content: 35 to 55 percent
Rock fragments: 35 to 60 percent—25 to 40 percent angular cobbles; 10 to 20 percent angular pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 6.6 to 8.4

C1 horizon
Hue: 2.5YR through 10YR
Value: 4, 5, or 6 dry; 3 or 4 moist
Texture: clay loam or clay
Clay content: 35 to 55 percent
Rock fragments: 35 to 60 percent—25 to 40 percent angular cobbles; 10 to 20 percent angular pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 8.4

C2 horizon
Hue: 2.5YR through 10YR
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 3, 4, 5, or 6
Texture, less than 2 mm: heavy clay loam or clay
Clay content: 35 to 55 percent
Rock fragments: 40 to 60 percent—30 to 45 percent angular cobbles; 10 to 15 percent angular pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 8.4

234F—Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes

Setting

Landform:
Tibs—Mountains
Whitecow—Mountains
Position on landform:
Tibs—Backslopes
Whitecow—Backslopes
Slope:
Tibs—25 to 60 percent
Whitecow—25 to 60 percent
Elevation: 4,200 to 4,700 feet

Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Composition

Major Components

Tibs and similar soils: 45 percent
Whitecow and similar soils: 35 percent

Minor Components

Hughesville and similar soils: 0 to 5 percent
Sheege and similar soils: 0 to 5 percent
Tomty and similar soils: 0 to 5 percent
Delette and similar soils: 0 to 5 percent

Major Component Description

Tibs

Surface layer texture: Cobbly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Whitecow

Surface layer texture: Cobbly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Twilight Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2.0 to 6.0 inches/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated sandy sedimentary beds
Slope range: 2 to 25 percent
Elevation range: 2,710 to 4,600 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Coarse-loamy, mixed, superactive, frigid Aridic Ustochrepts

Typical Pedon

Twilight sandy loam, 2 to 8 percent slopes, 1,800 feet south and 1,400 feet east of the northwest corner of sec. 18, T. 11 N., R. 29 E.

A—0 to 3 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; neutral; gradual smooth boundary.

Bw—3 to 11 inches; yellowish brown (10YR 5/4) fine sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk1—11 to 24 inches; yellowish brown (10YR 5/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; disseminated lime; few fine masses of lime; strongly effervescent; slightly alkaline; gradual smooth boundary.

Bk2—24 to 35 inches; light gray (10YR 7/2) fine sandy loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; disseminated lime; many medium masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Cr—35 to 60 inches; very pale brown (10YR 7/3) semiconsolidated sandy sedimentary beds.

Range in Characteristics

Depth to Cr horizon: 20 to 40 inches
Depth to Bk horizon: 10 to 20 inches

A horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2 or 3
Texture: fine sandy loam or sandy loam
Clay content: 5 to 20 percent
Reaction: pH 6.1 to 7.8

Bw horizon
Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 to 4
Texture: fine sandy loam or sandy loam
Clay content: 5 to 18 percent
Calcium carbonate equivalent: 0 to 3 percent
Reaction: pH 6.1 to 7.8

Bk horizons
Hue: 10YR or 2.5Y
Value: 5 to 7 dry; 4 to 6 moist
Chroma: 1 to 4
Texture: fine sandy loam or sandy loam
Clay content: 5 to 18 percent
Calcium carbonate equivalent: 5 to 15 percent
Reaction: 7.4 to 8.4

32B—Twilight sandy loam, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Twilight and similar soils: 85 percent

Minor Components

Busby and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Blacksheep and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

132B—Twilight-Blacksheep sandy loams, 2 to 8 percent slopes

Setting

Landform:
Twilight—Sedimentary plains
Blacksheep—Sedimentary plains
Position on landform:
Twilight—Backslopes, footslopes, and side slopes
Blacksheep—Shoulders and summits
Slope:
Twilight—2 to 8 percent
Blacksheep—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Twilight and similar soils: 45 percent
Blacksheep and similar soils: 40 percent

Minor Components

Busby and similar soils: 0 to 5 percent
Chinook and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent

Major Component Description

Twilight

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Blacksheep

Surface layer texture: Sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

32D—Twilight-Blacksheep-Rock outcrop complex, 4 to 25 percent slopes

Setting

Landform:
Twilight—Sedimentary plains and hills
Blacksheep—Sedimentary plains and hills
Position on landform:
Twilight—Backslopes, footslopes, and side slopes
Blacksheep—Shoulders and summits
Rock outcrop—Shoulders and summits
Slope:
Twilight—4 to 15 percent
Blacksheep—4 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Twilight and similar soils: 40 percent
Blacksheep and similar soils: 30 percent
Rock outcrop: 20 percent

Minor Components

Delpoint and similar soils: 0 to 5 percent
Cabbart and similar soils: 0 to 5 percent

Major Component Description

Twilight

Surface layer texture: Sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Blacksheep

Surface layer texture: Sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.6 inches

Rock outcrop

Definition: Areas of exposed sandstone bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

241E—Twilight-Blacksheep-Rock outcrop complex, 4 to 35 percent slopes

Setting

Landform:
Twilight—Sedimentary plains and hills
Blacksheep—Hills
Position on landform:
Twilight—Backslopes, footslopes, and side slopes
Blacksheep—Backslopes and side slopes
Rock outcrop—Shoulders and summits
Slope:
Twilight—4 to 25 percent
Blacksheep—15 to 35 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Twilight and similar soils: 35 percent
Blacksheep and similar soils: 30 percent
Rock outcrop: 20 percent

Minor Components

Cabba and similar soils: 0 to 5 percent
Doney and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent

Major Component Description

Twilight

Surface layer texture: Fine sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds

Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Blacksheep

Surface layer texture: Fine sandy loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, sandy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.6 inches

Rock outcrop

Definition: Areas of exposed sandstone bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

UL—Urban land

Composition

Major Components
Urban Land: 100 percent

Major Component Description

Definition: Areas with high levels of development including structures, paving, and highly disturbed soil.

Vanda Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, calcareous, frigid Vertic Ustorthents

Typical Pedon

Vanda silty clay, 0 to 4 percent slopes, 50 feet north and 1,600 feet east of the southwest corner of sec. 26, T. 11 N., R. 22 E.

A—0 to 2 inches; light gray (2.5Y 7/2) silty clay, dark grayish brown (2.5Y 4/2) moist; thin (1/4 to 1/2 inch thick) vesicular crust; moderate coarse platy structure; hard, very firm, sticky and plastic; few fine roots; moderately alkaline; abrupt wavy boundary.

Bz—2 to 12 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong coarse prismatic structure parting to strong coarse subangular blocky; very hard, very firm, sticky and plastic; few very fine roots; slightly effervescent; moderately alkaline; gradual wavy boundary.

Cy—12 to 19 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, sticky and plastic; common fine irregular masses and seams of gypsum; slightly effervescent; moderately alkaline; gradual wavy boundary.

Cyz—19 to 27 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, sticky and plastic; common fine irregular masses and seams of gypsum and other salts; slightly effervescent; strongly alkaline; diffuse wavy boundary.

Cz—27 to 60 inches; light brownish gray (2.5Y 6/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; very hard, very firm, sticky and plastic; common fine irregular masses and seams of salts; slightly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days when the soil temperature at a depth of 20 inches is 41 degrees F

A horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4 or 5 moist

Chroma: 1, 2, or 3
Clay content: 40 to 60 percent
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 20 to 30
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.9 to 9.6

Bz horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay, silty clay, or silty clay loam
Clay content: 35 to 60 percent
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 30
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.9 to 9.6

C horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay, silty clay, or silty clay loam
Clay content: 35 to 60 percent
Gypsum: 1 to 5 percent with total gypsum less than 150
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 30
Gypsum: 1 to 5 percent
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.9 to 9.6

25A—Vanda silty clay, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Vanda and similar soils: 85 percent

Minor Components

Gerdrum and similar soils: 0 to 5 percent
Creed and similar soils: 0 to 5 percent
Marvan and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Verson Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour) from 0 to 22 inches, moderately rapid below this depth (2.0 to 6.0 inches/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Clayey over loamy-skeletal, mixed, superactive Aridic Argiborolls

Typical Pedon

Verson clay loam, 0 to 4 percent slopes, 1,500 feet south and 800 feet east of the northwest corner of sec. 20, T. 11 N., R. 25 E.

A—0 to 4 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; neutral; abrupt smooth boundary.

Bt—4 to 9 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; common fine roots; common distinct clay films on faces of peds; slightly effervescent; slightly alkaline; abrupt smooth boundary.

Btk—9 to 14 inches; light brownish gray (10YR 6/2) silty clay, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to weak medium subangular blocky; slightly hard, firm, sticky and plastic; common fine roots; few distinct clay films on faces of peds; few medium irregular masses of lime; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Bk—14 to 22 inches; light brownish gray (10YR 6/2) gravelly clay loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; 20 percent pebbles; many medium and large irregular masses of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

2C—22 to 60 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, pale brown (10YR 5/3) moist; massive; loose, nonsticky and nonplastic; few fine roots to 26 inches; 5 percent cobbles, 75 percent pebbles; continuous distinct lime coatings on coarse fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 43 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 12 inches
Depth to Bk horizon: 11 to 21 inches
Depth to 2C horizon: 15 to 36 inches

A horizon
Hue: 10YR or 2.5Y
Value: 3 or 4 moist
Chroma: 2 or 3
Clay content: 27 to 40 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Reaction: pH 6.1 to 7.3

Bt horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2, 3, or 4
Texture: clay loam, silty clay loam, clay, or silty clay
Clay content: 35 to 55 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
Reaction: pH 6.1 to 7.8

Btk and Bk horizons
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, 4, or 6
Texture: clay loam, silty clay loam, clay, or silty clay
Clay content: 35 to 50 percent
Rock fragments: 0 to 25 percent—0 to 5 percent cobbles, 0 to 20 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

2C horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, 4, or 6
Texture: sandy loam or loam
Clay content: 5 to 25 percent
Rock fragments: 50 to 85 percent—5 to 10 percent cobbles, 45 to 75 percent pebbles
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.4 to 8.4

58A—Verson clay loam, 0 to 4 percent slopes

Setting

Landform: Relict stream terraces
Slope: 0 to 4 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Verson and similar soils: 85 percent

Minor Components

Musselshell and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent
Ethridge and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Volborg Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated shale residuum
Slope range: 4 to 25 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey, smectitic, acid, frigid, shallow Aridic Ustorthents

Typical Pedon

Volborg silty clay, in an area of Neldore-Volborg silty clays, 4 to 25 percent slopes, in rangeland, 2,400 feet north and 1,800 feet west of the southeast corner of sec. 19, T. 11 N., R. 25 E.

A—0 to 3 inches; gray (10YR 5/1) silty clay, dark gray (10YR 4/1) moist; weak very fine granular structure; loose, very friable, sticky and plastic; common fine and medium roots; strongly acid; clear smooth boundary.

C1—3 to 13 inches; gray (10YR 5/1) silty clay, dark gray (10YR 4/1) moist; massive; hard, firm, sticky and plastic; few medium and common fine roots; very strongly acid; clear smooth boundary.

C2—13 to 17 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; massive; few medium and fine roots; very strongly acid; clear smooth boundary.

Cr—17 to 60 inches; grayish brown (2.5Y 5/2) semiconsolidated shale.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Moisture control section: between 4 and 12 inches, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the temperature at a depth of 20 inches is 41 degrees F or higher
Depth to bedrock: 10 to 20 inches

A horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 1, 2, or 3
Clay content: 40 to 50 percent
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 0 to 5
Reaction: pH 4.5 to 6.5

C horizons
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 1, 2, or 3
Texture: silty clay loam, silty clay, or clay
Clay content: 35 to 50 percent
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 0 to 13
Reaction: pH 3.6 to 5.5

Warhorse Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains
Parent material: Semiconsolidated shale residuum
Slope range: 1 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Clayey, smectitic, frigid, shallow Aridic Haplustalfs

Typical Pedon

Warhorse loam in an area of Weingart-Warhorse loams, 1 to 8 percent slopes, 1,500 feet east and 50 feet north of the southwest corner of sec. 13, T. 9 N., R. 26 E.

A—0 to 3 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; weak fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; slightly alkaline; clear smooth boundary.

Bt—3 to 12 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; many fine and very fine roots; continuous distinct clay films on faces of peds; slightly alkaline; clear smooth boundary.

BC—12 to 16 inches; light brownish gray (2.5Y 6/2) silty clay loam, grayish brown (2.5Y 5/2) moist;

massive; hard, firm, sticky and plastic; common fine and very fine roots; 50 percent soft sandstone fragments; moderately alkaline; gradual wavy boundary.

Cr—16 to 60 inches; semiconsolidated sedimentary beds

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Depth to Cr horizon: 10 to 20 inches

A horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 18 to 27 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
Electrical conductivity: 0 to 2 mmhos/cm
Reaction: pH 6.6 to 7.8

Bt horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam, or silty clay
Clay content: 35 to 45 percent
Rock fragments: 0 to 10 percent pebbles
Electrical conductivity: 0 to 2 mmhos/cm
Reaction: pH 6.6 to 7.8

BC horizon
Hue: 10YR or 2.5Y
Value: 4, 5, or 6 dry; 3, 4, or 5 moist
Chroma: 2 or 3
Texture: clay loam, silty clay loam, or silty clay
Clay content: 30 to 40 percent
Rock fragments: 50 to 90 percent—50 to 80 percent soft shale fragments; 0 to 10 percent hard sandstone fragments
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 0 to 5
Reaction: pH 6.6 to 8.4

W—Water

Composition

Major Components

Water: 100 percent

Major Component Description

Definition: Areas of open water

Wayden Series

Depth class: shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Hills, sedimentary plains
Parent material: Semiconsolidated shale residuum
Slope range: 4 to 60 percent
Elevation range: 3,200 to 4,600 feet
Annual precipitation: 15 to 19 inches
Frost free period: 105 to 135 days

Taxonomic Class: Clayey, smectitic, calcareous, frigid, shallow Typic Ustorthents

Typical Pedon

Wayden silty clay loam in an area of Wayden-Castner complex, 8 to 45 percent slopes, 300 feet east and 1,300 feet north of the southwest corner of sec. 9, T. 11 N., R. 22 E.

A—0 to 4 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark brownish gray (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; many fine and very fine roots; slightly effervescent; moderately alkaline; gradual smooth boundary.

C1—4 to 11 inches; light brownish gray (2.5Y 6/2) silty clay, dark brownish gray (2.5Y 4/2) moist; moderate coarse subangular blocky structure; hard, firm, sticky and plastic; common fine and very fine roots; strongly effervescent; moderately alkaline; gradual smooth boundary.

C2—11 to 17 inches; light brownish gray (2.5Y 6/2) silty clay, dark brownish gray (2.5Y 4/2) moist; massive; hard, firm, sticky and plastic; common fine and very fine roots; many soft shale chips; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cr—17 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 40 to 47 degrees F
Moisture control section: between 4 and 12 inches
Depth to Cr horizon: 10 to 20 inches

A horizon
- Hue: 2.5Y or 5Y
- Value: 5, 6, or 7 dry; 3, 4, or 5 moist
- Chroma: 2 or 3
- Clay content: 30 to 40 percent
- Calcium carbonate equivalent: 0 to 5
- Reaction: pH 7.4 to 9.0

C horizons
- Hue: 2.5YR or 5Y
- Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
- Chroma: 1, 2, 3, or 4
- Clay content: 35 to 50 percent
- Electrical conductivity: 0 to 8 mmhos/cm
- Calcium carbonate equivalent: 5 to 10 percent
- Reaction: pH 7.4 to 9.0

261F—Wayden-Castner complex, 8 to 45 percent slopes

Setting

Landform:
- Wayden—Hills
- Castner—Hills

Position on landform:
- Wayden—Backslopes
- Castner—Shoulders and summits

Slope:
- Wayden—15 to 45 percent
- Castner—8 to 25 percent

Elevation: 4,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 90 to 135 days

Composition

Major Components

- Wayden and similar soils: 50 percent
- Castner and similar soils: 35 percent

Minor Components

- Areas of rock outcrop: 0 to 5 percent
- Kuro and similar soils: 0 to 5 percent
- Cabba and similar soils: 0 to 5 percent

Major Component Description

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Castner

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

262E—Wayden-Windham complex, 4 to 25 percent slopes

Setting

Landform:
- Wayden—Sedimentary plains and hills
- Windham—Relict stream terraces

Position on landform:
- Wayden—Backslopes and side slopes
- Windham—Shoulders and summits

Slope:
- Wayden—4 to 25 percent
- Windham—4 to 8 percent

Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

- Wayden and similar soils: 45 percent
- Windham and similar soils: 40 percent

Minor Components

- Cabba and similar soils: 0 to 5 percent
- Judith and similar soils: 0 to 5 percent
- Lap and similar soils: 0 to 5 percent

Major Component Description

Wayden

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Windham

Surface layer texture: Gravelly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Weingart Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Very slow (0.01 to 0.06 inch/hour)
Landform: Sedimentary plains
Parent material: Semiconsolidated shale residuum
Slope range: 1 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Torrertic Natrustalfs

Typical Pedon

Weingart loam in an area of Weingart-Warhorse loams, 1 to 8 percent slopes, 150 feet west and 900 feet north of the southeast corner of sec. 13, T. 9 N., R. 26 E.

E—0 to 2 inches; pale brown (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak fine and very fine platy structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; neutral; abrupt wavy boundary.

Btn1—2 to 6 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong medium columnar structure; very hard, firm, sticky and plastic; many fine and medium roots; continuous distinct clay films on faces of peds; slightly alkaline; clear smooth boundary.

Btn2—6 to 14 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 4/3) moist; strong medium subangular blocky structure; very hard, firm, sticky and plastic; common very fine and few fine roots; continuous distinct clay films on faces of peds; moderately alkaline; clear smooth boundary.

Bkn—14 to 21 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong fine and medium subangular blocky structure; very hard, firm, sticky and plastic; common very fine and few fine roots; common fine irregular masses of lime; slightly effervescent; strongly alkaline; gradual wavy boundary.

Bknyz—21 to 32 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; many fine irregular masses of gypsum and other salts; few fine irregular masses of lime; slightly effervescent; strongly alkaline; gradual wavy boundary.

Cr—32 to 60 inches; semiconsolidated sedimentary beds.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches; dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature is 41 degrees F or above
Depth to Bkn horizon: 7 to 16 inches
Depth to Bknyz horizon: 10 to 24 inches
Depth to Cr horizon: 20 to 40 inches

E horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 3, 4, 5, or 6 moist

Chroma: 2 or 3
Clay content: 18 to 27 percent
Rock fragments: 0 to 10 percent—0 to 10 percent stones and cobbles, 0 to 5 percent hard shale, 0 to 5 percent soft shale
Reaction: pH 5.6 to 7.8

Btn horizons
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: silty clay loam, clay, silty clay, or sandy clay
Clay content: 35 to 60 percent
Rock fragments: 0 to 10 percent—0 to 5 percent hard shale, 0 to 5 percent soft shale
Electrical conductivity: 2 to 8 mmhos/cm
Sodium adsorption ratio: 10 to 30
Reaction: pH 6.6 to 9.6
Note: When the SAR is less than 13, there is more exchangeable magnesium plus sodium then calcium plus exchange acidity.

Bkn horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: clay loam, silty clay, clay, sandy clay, or silty clay loam
Clay content: 35 to 55 percent
Rock fragments: 0 to 10 percent—0 to 5 percent hard shale, 0 to 5 percent soft shale
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 30
Gypsum: 0 to 1 percent
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 9.6

Bknyz horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 1, 2, 3, or 4
Texture: clay, silty clay, clay loam, or silty clay loam
Clay content: 35 to 55 percent
Rock fragments: 0 to 10 percent—0 to 5 percent hard shale, 0 to 5 percent soft shale
Electrical conductivity: 4 to 16 mmhos/cm
Sodium adsorption ratio: 13 to 30
Gypsum: 1 to 5 percent
Calcium carbonate equivalent: 2 to 12 percent
Reaction: pH 7.9 to 9.6

26A—Weingart loam, 1 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 1 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Weingart and similar soils: 85 percent

Minor Components

Gerdrum and similar soils: 0 to 2 percent
Creed and similar soils: 0 to 3 percent
Warhorse and similar soils: 0 to 5 percent
Tanna and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

26B—Weingart-Warhorse loams, 1 to 8 percent slopes

Setting

Landform:
Weingart—Sedimentary plains
Warhorse—Sedimentary plains

Slope:
Weingart—1 to 8 percent
Warhorse—1 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Weingart and similar soils: 45 percent
Warhorse and similar soils: 40 percent

Minor Components

Tanna and similar soils: 0 to 5 percent
Gerdrum and similar soils: 0 to 5 percent
Creed and similar soils: 0 to 5 percent

Major Component Description

Weingart

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.7 inches

Warhorse

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Whitecow Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains
Parent material: Alluvium or colluvium
Slope range: 2 to 60 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 90 to 110 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Calcic Ustochrepts

Typical Pedon

Whitecow cobbly clay loam, in an area of Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes, 800 feet west and 500 feet south of the northeast corner of sec. 6, T. 11 N., R. 22 E.

Oi—undecomposed and slightly decomposed needles and twigs.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) cobbly clay loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine and common medium roots; 5 percent stones, 15 percent cobbles, 10 percent pebbles; strongly effervescent; slightly alkaline; clear smooth boundary.

A2—3 to 6 inches; grayish brown (10YR 5/2) cobbly clay loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and common medium roots; 5 percent stones, 15 percent cobbles, 15 percent pebbles; strongly effervescent; slightly alkaline; clear wavy boundary.

Bk1—6 to 20 inches; very pale brown (10YR 7/3) very gravelly loam, yellowish brown (10YR 5/4) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; 5 percent stones, 10 percent cobbles, 30 percent pebbles; disseminated lime; common distinct lime casts on underside of coarse fragments; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—20 to 60 inches; very pale brown (10YR 7/3) extremely gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and medium roots; 10 percent stones, 10 percent cobbles, 55 percent pebbles; disseminated lime;

common distinct lime casts on underside of coarse fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 42 degrees F
Moisture control section: between 4 and 12 inches

A horizons
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2 or 3
Texture: loam or clay loam
Clay content: 18 to 35 percent
Rock fragments: 15 to 35 percent—10 to 20 percent stones and cobbles, 5 to 15 percent pebbles and channers
Calcium carbonate equivalent: 0 to 5 percent
Reaction: pH 7.4 to 8.4

Bk1 horizon
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 18 to 35 percent
Rock fragments: 35 to 70 percent—0 to 30 percent stones and cobbles, 5 to 60 percent pebbles and channers
Calcium carbonate equivalent: 35 to 50 percent
Reaction: pH 7.4 to 9.0

Bk2 horizon
Hue: 10YR or 2.5Y
Value: 6, 7, or 8 dry; 4, 5, 6, or 7 moist
Chroma: 2, 3, or 4
Texture: loam, sandy loam, or clay loam
Clay content: 18 to 35 percent
Rock fragments: 60 to 90 percent—5 to 30 percent stones and cobbles, 55 to 70 percent pebbles and channers
Calcium carbonate equivalent: 40 to 50 percent
Reaction: pH 7.4 to 9.0

Windham Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Relict stream terraces
Parent material: Alluvium
Slope range: 2 to 15 percent
Elevation range: 3,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost free period: 105 to 135 days

Taxonomic Class: Loamy-skeletal, carbonatic Typic Calciborolls

Typical Pedon

Windham very stony loam, 2 to 15 percent slopes, 500 feet west and 2,400 feet south of the northeast corner of sec. 9, T. 11 N., R. 22 E.

A—0 to 6 inches; dark grayish brown (10YR 4/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate coarse granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 15 percent stones, 10 percent limestone cobbles, 15 percent limestone pebbles; continuous distinct lime casts on undersides of cobbles; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk1—6 to 11 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; loose, very friable, sticky and nonplastic; many fine and very fine roots; 20 percent limestone pebbles; continuous prominent lime casts and pendants on undersides of pebbles; disseminated lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—11 to 22 inches; very pale brown (10YR 8/2) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; loose, very friable, sticky and nonplastic; few fine and very fine roots; 30 percent limestone pebbles, 10 percent limestone cobbles; continuous prominent lime casts and pendants on the undersides of pebbles and cobbles; common fine masses of lime; disseminated lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bk3—22 to 60 inches; very pale brown (10YR 7/3) extremely gravelly loam, light yellowish brown (10YR 6/4) moist; massive; loose, very friable, sticky and nonplastic; few fine and very fine roots; 60 percent limestone pebbles, 10 percent cobbles; continuous distinct lime casts on undersides of pebbles and cobbles; common fine masses of lime; disseminated lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F
Mollic epipedon thickness: 7 to 16 inches
Depth to calcic horizon: 5 to 10 inches

A horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2, or 3
Texture: loam or clay loam
Clay content: 18 to 35 percent
Rock fragments: 10 to 75 percent—0 to 15 percent stones, 0 to 10 percent cobbles, 10 to 50 percent pebbles
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

Bk1 horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 4, 5, or 6 dry; 3, 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 18 to 35 percent
Rock fragments: 10 to 75 percent—0 to 20 percent cobbles, 10 to 55 percent pebbles
Calcium carbonate equivalent: 35 to 60 percent
Reaction: pH 7.9 to 8.4

Bk2 horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or sandy loam
Clay content: 18 to 35 percent
Rock fragments: 35 to 75 percent—0 to 20 percent cobbles; 35 to 55 percent pebbles
Calcium carbonate equivalent: 40 to 60 percent
Reaction: pH 7.9 to 8.4

Bk3 horizon
Hue: 7.5YR, 10YR, or 2.5Y
Value: 5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or sandy loam
Clay content: 18 to 35 percent
Rock fragments: 60 to 80 percent—5 to 20 percent cobbles; 55 to 60 percent pebbles
Calcium carbonate equivalent: 40 to 60 percent
Reaction: pH 7.9 to 8.4

291C—Windham very stony loam, 2 to 15 percent slopes

Setting

Landform: Relict stream terraces
Slope: 2 to 15 percent
Elevation: 4,200 to 4,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Windham and similar soils: 90 percent

Minor Components

Maiden and similar soils: 0 to 5 percent
Judith and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Very stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Winifred Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Hills
Parent material: Semiconsolidated shale residuum
Slope range: 15 to 45 percent
Elevation range: 4,200 to 4,700 feet
Annual precipitation: 15 to 19 inches
Frost-free period: 90 to 125 days

Taxonomic Class: Fine, smectitic Vertic Haploborolls

Typical Pedon

Winifred clay loam, in an area of Bitton-Winifred-Castner complex, 15 to 60 percent slopes, 2,100 feet west and 2,200 feet north of the southeast corner of sec. 7, T. 11 N., R. 23 E.

A—0 to 3 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate very fine subangular blocky structure; slightly hard, friable, sticky and plastic; many fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—3 to 12 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong fine subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk1—12 to 21 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong medium subangular blocky structure; very hard, firm, very sticky and very plastic; common very fine and few fine roots; few fine irregular masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—21 to 35 inches; light brownish gray (10YR 6/2) silty clay loam, grayish brown (10YR 5/2) moist; strong medium subangular blocky structure; very hard, firm, very sticky and very plastic; few fine and very fine roots; common medium irregular masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Cr—35 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches
Mollic epipedon thickness: 7 to 15 inches
Depth to bedrock: 20 to 40 inches
Depth to Bk horizon: 11 to 22 inches

A horizon
Hue: 10YR or 2.5Y
Value: 3, 4, or 5 dry; 2 or 3 moist
Chroma: 2 or 3
Clay content: 27 to 40 percent
Rock fragments: 0 to 5 percent pebbles
Reaction: pH 6.6 to 7.8

Bw horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 3 or 4 moist
Chroma: 2 or 3
Texture: clay loam, silty clay, clay, or silty clay loam
Clay content: 35 to 50 percent
Rock fragments: 0 to 5 percent pebbles
Calcium carbonate equivalent: 1 to 5 percent
Reaction: pH 7.4 to 8.4

Bk horizons
Hue: 10YR or 2.5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2 or 3
Texture: clay, silty clay, silty clay loam, or clay loam
Clay content: 35 to 50 percent
Rock fragments: 0 to 5 percent pebbles
Sodium adsorption ratio: 1 to 5
Calcium carbonate equivalent: 5 to 15 percent
Gypsum: 1 to 5 percent
Reaction: pH 7.4 to 9.0

Yamacall Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, stream terraces, sedimentary plains, and hills
Parent material: Alluvium
Slope range: 0 to 15 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aridic Ustochrepts

Typical Pedon

Yamacall loam, calcareous, 2 to 8 percent slopes, 2,250 feet north and 2,000 feet west of the southeast corner of sec. 21, T. 9 N., R. 27 E.

A—0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; moderately alkaline; clear smooth boundary.

Bw—3 to 11 inches; light gray (2.5Y 7/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk—11 to 25 inches; light gray (2.5Y 7/2) loam, light olive brown (2.5Y 5/4) moist; moderate medium prismatic structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

BC—25 to 60 inches; light gray (2.5Y 7/2) loam, light olive brown (2.5Y 5/4) moist; massive; few very fine roots; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: between 4 and 12 inches, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher
Depth to Bk horizon: 10 to 20 inches
Note: a BC horizon is allowed

A horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5 or 6 dry; 3, 4, or 5 moist
Chroma: 2, 3, or 4
Texture: loam or clay loam
Clay content: 18 to 35 percent
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Calcium carbonate equivalent: 0 to 10 percent
Effervescence: none to strongly
Reaction: pH 6.6 to 8.4

Bw horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or silt loam
Clay content: 18 to 35 percent with 15 to 35 percent fine sand and coarser
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Calcium carbonate equivalent: 0 to 15 percent
Effervescence: none to strongly
Reaction: pH 6.6 to 9.0

Bk horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or silt loam
Clay content: 18 to 30 percent with 15 to 35 percent fine sand and coarser
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 1 to 5
Calcium carbonate equivalent: 5 to 15 percent
Effervescence: strongly or violently
Reaction: pH 7.9 to 9.0

BC horizon
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, 7, or 8 dry; 4, 5, or 6 moist
Chroma: 2, 3, or 4
Texture: loam, clay loam, or silt loam
Clay content: 10 to 30 percent with 15 to 35 percent fine sand and coarser
Rock fragments: 0 to 15 percent—0 to 5 percent cobbles, 0 to 10 percent pebbles
Electrical conductivity: 0 to 4 mmhos/cm
Sodium adsorption ratio: 1 to 5
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.9 to 9.0

34A—Yamacall clay loam, 0 to 2 percent slopes

Setting

Landform: Sedimentary plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Yamacall, calcareous soils: 0 to 5 percent
Kobase and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

34B—Yamacall clay loam, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Yamacall, calcareous soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

37A—Yamacall clay loam, calcareous, 0 to 2 percent slopes

Setting

Landform: Sedimentary plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Yamacall, noncalcareous and similar soils: 0 to 5 percent
Kobase and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

37B—Yamacall clay loam, calcareous, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Yamacall, noncalcareous and similar soils: 0 to 5 percent
Kobase and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

33A—Yamacall loam, 0 to 2 percent slopes

Setting

Landform: Sedimentary plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Busby and similar soils: 0 to 5 percent
Kobase and similar soils: 0 to 5 percent
Yamacall, calcareous soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

33B—Yamacall loam, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Busby and similar soils: 0 to 5 percent
Yamacall, calcareous soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41A—Yamacall loam, calcareous, 0 to 2 percent slopes

Setting

Landform: Sedimentary plains
Slope: 0 to 2 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Yamacall, noncalcareous and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent
Kobase and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41B—Yamacall loam, calcareous, 2 to 8 percent slopes

Setting

Landform: Sedimentary plains
Slope: 2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 85 percent

Minor Components

Yamacall, noncalcareous and similar soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

35B—Yamacall-Busby complex, 2 to 8 percent slopes

Setting

Landform:
Yamacall—Sedimentary plains
Busby—Sedimentary plains
Slope:
Yamacall—2 to 8 percent
Busby—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 45 percent
Busby and similar soils: 40 percent

Minor Components

Yamacall, calcareous soils: 0 to 5 percent
Delpoint and similar soils: 0 to 5 percent
Twilight and similar soils: 0 to 5 percent

Major Component Description

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Busby

Surface layer texture: Fine sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

36B—Yamacall-Delpoint loams, 2 to 8 percent slopes

Setting

Landform:
Yamacall—Sedimentary plains
Delpoint—Sedimentary plains
Slope:
Yamacall—2 to 8 percent
Delpoint—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 45 percent
Delpoint and similar soils: 40 percent

Minor Components

Yamacall, calcareous soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent
Cabbart and similar soils: 0 to 5 percent

Major Component Description

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41C—Yamacall-Delpoint loams, calcareous, 2 to 8 percent slopes

Setting

Landform:
Yamacall—Sedimentary plains
Delpoint—Sedimentary plains
Slope:
Yamacall—2 to 8 percent
Delpoint—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 45 percent
Delpoint and similar soils: 40 percent

Minor Components

Yamacall, noncalcareous and similar soils: 0 to 5 percent
Delpoint, noncalcareous and similar soils: 0 to 5 percent
Busby and similar soils: 0 to 5 percent

Major Component Description

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.1 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

256C—Yamacall-Havre-Delpoint loams, 2 to 8 percent slopes

Setting

Landform:
Yamacall—Sedimentary plains
Havre—Flood plains
Delpoint—Sedimentary plains
Slope:
Yamacall—2 to 6 percent
Havre—2 to 4 percent
Delpoint—4 to 8 percent
Elevation: 3,200 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yamacall and similar soils: 35 percent
Havre and similar soils: 30 percent
Delpoint and similar soils: 30 percent

Minor Components

Twilight and similar soils: 0 to 5 percent

Major Component Description

Yamacall

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.7 inches

Havre

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Forest land
Flooding: Rare
Available water capacity: Mainly 9.7 inches

Delpoint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated, loamy sedimentary beds
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Yawdim Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Sedimentary plains and hills
Parent material: Semiconsolidated shale residuum
Slope range: 4 to 60 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Clayey, smectitic, calcareous, frigid, shallow Aridic Ustorthents

Typical Pedon

Yawdim silty clay loam, in an area of Yawdim-Abor complex, 4 to 15 percent slopes, 2,400 feet north and 2,500 feet east of the southwest corner of sec. 21, T. 11 N., R. 29 E.

A—0 to 2 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, friable, sticky and plastic; few fine and very fine roots; slightly effervescent; slightly alkaline; clear smooth boundary.

C1—2 to 6 inches; pale brown (10YR 6/3) silty clay, dark grayish brown (10YR 4/2) moist; strong medium subangular blocky structure; slightly hard, friable, sticky and plastic; many very fine roots; strongly effervescent; slightly alkaline; clear smooth boundary.

C2—6 to 16 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; strong medium and coarse subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; strongly effervescent; moderately alkaline; gradual wavy boundary.

Cr—16 to 60 inches; light gray (10YR 6/1) semiconsolidated shale.

Range in Characteristics

Depth to Cr horizon: 10 to 20 inches

A horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 3 or 4 moist
Chroma: 1 or 2
Texture: silty clay or silty clay loam
Clay content: 27 to 50 percent
Reaction: pH 6.6 to 7.8

C horizon
Hue: 10YR, 2.5Y or 5Y
Value: 5 to 8 dry; 4 to 6 moist
Chroma 1 to 4
Texture: silty clay loam, clay loam, or clay
Clay content: 35 to 50 percent
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

67D—Yawdim silty clay loam, 4 to 25 percent slopes

Setting

Landform: Sedimentary plains and hills
Slope: 4 to 25 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yawdim and similar soils: 85 percent

Minor Components

Megonot and similar soils: 0 to 5 percent
Abor and similar soils: 0 to 5 percent
Volborg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

73E—Yawdim-Abor complex, 15 to 60 percent slopes

Setting

Landform:
Yawdim—Hills
Abor—Hills
Position on landform:
Yawdim—Shoulders and summits
Abor—Backslopes
Slope:
Yawdim—15 to 60 percent
Abor—15 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yawdim and similar soils: 45 percent
Abor and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent
Orinoco and similar soils: 0 to 5 percent

Major Component Description

Yawdim

Surface layer texture: Silty clay
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.8 inches

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

73D—Yawdim-Abor complex, 4 to 15 percent slopes

Setting

Landform:
  Yawdim—Sedimentary plains and hills
  Abor—Sedimentary plains and hills
Position on landform:
  Yawdim—Shoulders and summits
  Abor—Backslopes, footslopes, and side slopes
Slope:
  Yawdim—4 to 15 percent
  Abor—4 to 15 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yawdim and similar soils: 45 percent
Abor and similar soils: 40 percent

Minor Components

Weingart and similar soils: 0 to 5 percent
Orinoco and similar soils: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent

Major Component Description

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.7 inches

Abor

Surface layer texture: Silty clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

95E—Yawdim-Crago complex, 4 to 35 percent slopes

Setting

Landform:
  Yawdim—Sedimentary plains and hills
  Crago—Relict stream terraces
Position on landform:
  Yawdim—Backslopes and side slopes
  Crago—Shoulders and summits
Slope:
  Yawdim—4 to 35 percent
  Crago—4 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yawdim and similar soils: 45 percent
Crago and similar soils: 40 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Musselshell and similar soils: 0 to 5 percent
Attewan and similar soils: 0 to 5 percent

Major Component Description

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

Crago

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

167E—Yawdim-Orinoco silty clay loams, 15 to 35 percent slopes

Setting

Landform:
  Yawdim—Hills
  Orinoco—Hills
Position on landform:
  Yawdim—Shoulders and summits
  Orinoco—Backslopes, footslopes, and side slopes
Slope:
  Yawdim—15 to 35 percent
  Orinoco—15 to 35 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yawdim and similar soils: 45 percent
Orinoco and similar soils: 40 percent

Minor Components

Cabbart and similar soils: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent

Major Component Description

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

Orinoco

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

167D—Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes

Setting

Landform:
  Yawdim—Sedimentary plains and hills
  Orinoco—Sedimentary plains and hills
Position on landform:
  Yawdim—Shoulders and summits
  Orinoco—Backslopes, footslopes, and side slopes
Slope:
  Yawdim—4 to 15 percent
  Orinoco—4 to 15 percent
Elevation: 2,710 to 4,200 feet

Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Yawdim and similar soils: 45 percent
Orinoco and similar soils: 40 percent

Minor Components

Megonot and similar soils: 0 to 5 percent
Neldore and similar soils: 0 to 5 percent
Cabbart and similar soils: 0 to 5 percent

Major Component Description

Yawdim

Surface layer texture: Silty clay loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.7 inches

Orinoco

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Zatoville Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.2 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 8 percent
Elevation range: 2,710 to 4,200 feet
Annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Taxonomic Class: Fine, smectitic, frigid Torrertic Ustochrepts

Typical Pedon

Zatoville silty clay loam, 0 to 8 percent slopes, 1,900 feet south and 1,000 feet east of the northwest corner of sec. 26, T. 11 N., R. 22 E.

Ap—0 to 2 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; common fine roots; moderately alkaline; abrupt smooth boundary.

Bw—2 to 13 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong coarse prismatic structure parting to strong coarse subangular blocky; very hard, very firm, sticky and plastic; common fine roots; moderately alkaline; gradual wavy boundary.

Bk—13 to 19 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine and medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few fine roots; common fine irregular masses of lime; slightly effervescent; moderately alkaline; gradual wavy boundary.

By1—19 to 35 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure; very hard, very firm, very sticky and very plastic; few fine roots; common fine and medium irregular masses of gypsum; strongly effervescent; moderately alkaline; gradual wavy boundary.

By2—35 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; very hard, very firm, sticky and plastic; many fine and medium irregular masses and seams of gypsum; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 43 to 47 degrees F
Moisture control section: between 4 and 12 inches, dry in all parts between four-tenths and five-tenths of the cumulative days per year when the soil

temperature at a depth of 20 inches is 41 degrees F or higher
Depth to By horizon: 13 to 24 inches

Ap horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Clay content: 30 to 40 percent
Electrical conductivity: 0 to 2 mmhos/cm
Reaction: pH 7.4 to 9.0

Bw horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: silty clay loam or silty clay
Clay content: 33 to 45 percent
Electrical conductivity: 0 to 4 mmhos/cm
Calcium carbonate equivalent: 1 to 5
Reaction: pH 7.4 to 9.0

Bk horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: silty clay loam or silty clay
Clay content: 35 to 45 percent
Electrical conductivity: 4 to 8 mmhos/cm
Sodium adsorption ratio: 1 to 13
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 9.0

By horizons
Hue: 10YR, 2.5Y, or 5Y
Value: 5, 6, or 7 dry; 4 or 5 moist
Chroma: 2 or 3
Texture: silty clay loam or silty clay
Clay content: 35 to 45 percent
Electrical conductivity: 8 to 16 mmhos/cm
Sodium adsorption ratio: 18 to 30
Gypsum: 10 to 20
Calcium carbonate equivalent: 0 to 10 percent
Reaction: pH 7.9 to 9.0

38B—Zatoville silty clay loam, 0 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Slope: 0 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Zatoville and similar soils: 85 percent

Minor Components

Kobase and similar soils: 0 to 5 percent
Marvan and similar soils: 0 to 5 percent
Marias and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 7.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

138B—Zatoville-Orinoco silty clay loams, 2 to 8 percent slopes

Setting

Landform:
Zatoville—Alluvial fans and stream terraces
Orinoco—Sedimentary plains
Position on landform:
Zatoville—Footslopes
Orinoco—Backslopes
Slope:
Zatoville—2 to 8 percent
Orinoco—2 to 8 percent
Elevation: 2,710 to 4,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 105 to 135 days

Composition

Major Components

Zatoville and similar soils: 45 percent
Orinoco and similar soils: 40 percent

Minor Components

Kobase and similar soils: 0 to 5 percent
Yawdim and similar soils: 0 to 5 percent
Megonot and similar soils: 0 to 5 percent

Major Component Description

Zatoville

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 7.6 inches

Orinoco

Surface layer texture: Silty clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and areal extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillite. Weakly metamorphosed mudstone or shale.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3.75
Low	3.75 to 5.0
Moderate	5.0 to 7.5
High	more than 7.5

Avalanche chute. The track or path formed by an avalanche.

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hill slopes. Back slopes in profile are commonly steep and linear and descend to a foot slope. In terms of gradational process, back slopes are erosional forms produced mainly by mass wasting and running water.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep or very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition from woody vegetation and thus to allow understory grasses and forbs to recover or to make conditions favorable for reseeding. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, a felled tree generally is reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Cirque. A semicircular, concave, bowllike area that has steep faces primarily resulting from erosive activity of a mountain glacier.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey soil. Silty clay, sandy clay, or clay.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from the adjacent stands.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent cobbles, and extremely cobbly soil material is more than 60 percent cobbles.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. Any tillage and planting system in which a cover of crop residue is maintained on at least 30 percent of the soil surface after planting in order to reduce the hazard of water erosion; in areas where soil blowing is the primary concern, a system that maintains a cover of at least 1,000 pounds of flat residue of small grain or the equivalent during the critical erosion period.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called culmination of mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit the use of a full stripcropping pattern.

Dominant Trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Esker. A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier and that were left behind when the ice melted. Eskers range from less than a mile to more than 100 miles in length and from 10 to 100 feet in height.

Even aged. Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. A firebreak also serves as a line from which to work and to facilitate the movement of fire fighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothills. A region of relatively low, rounded hills at the base of a mountain range.

Footslope. The geomorphic component that forms the inner, gently inclined surface at the base of a hill slope. The surface profile is dominantly concave. In terms of gradational processes, a foot slope is a transition zone between an upslope site of erosion (back slope) and a downslope site of deposition (toe slope).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Giant ripple mark. The undulating surface sculpture produced in noncoherent granular materials by currents of water and by the agitation of water in wave action during the draining of large glacial lakes, such as Glacial Lake Missoula.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Habitat type. An aggregation of all land areas capable of producing similar climax plant communities.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon.—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and are less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. A moundlike hill of glacial drift, composed chiefly of stratified sand and gravel.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lateral moraine. A ridgelike moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from the valley walls by glacial abrasion and plucking or by mass wasting.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low-residue crops. Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Microhigh. An area that is 2 to 12 inches higher than the adjacent microlow.

Microlow. An area that is 2 to 12 inches lower than the adjacent microhigh.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Miscellaneous water. A sewage lagoon, an industrial waste pit, a fish hatchery, or a similar water area.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine. An accumulation of glacial drift in a topographic landform of its own, resulting chiefly from the direct action of glacial ice. Some types are lateral, recessional, and terminal.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes greater than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. An extensive area of glaciofluvial material that was deposited by meltwater streams.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch

Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quartzite, metamorphic. Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

Quartzite, sedimentary. Very hard but unmetamorphosed sandstone consisting chiefly of quartz grains.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3

Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Recessional moraine. A moraine formed during a temporary but significant halt in the retreat of a glacier.

Red beds. Sedimentary strata mainly red in color and composed largely of sandstone and shale.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. Areas that have more than 90 percent of the surface covered by stones or boulders. Voids contain no soil material and virtually no vegetation other than lichens. The areas commonly are at the base of mountain slopes, but some are on mountain slopes as deposits of cobbles, stones, and boulders left by Pleistocene glaciation or by periglacial phenomena.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salinity. The electrical conductivity of a saline soil. It is expressed, in millimhos per centimeter, as follows:

Nonsaline	0 to 4
Slightly saline	4 to 8
Moderately saline	8 to 16
Strongly saline	more than 16

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Sand or loamy sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Scribner's log rule. A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

Sedimentary plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand;

shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Sedimentary uplands. Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the back slope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant or dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slickens. Accumulations of fine textured material, such as material separated in placer-mine and ore-mill operations. Slickens from ore mills commonly consist of freshly ground rock that has undergone chemical treatment during the milling process.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is loamy or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level	0 to 2 percent
Gently sloping	2 to 4 percent
Moderately sloping	4 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 45 percent
Very steep	more than 45 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter or loosen a layer that is restrictive to roots.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Tailwater. The water directly downstream of a structure.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances. It commonly is a massive arcuate ridge or complex of ridges underlain by till and other types of drift.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by or consists of till and that has a slope of 0 to 8 percent.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill. Toe slopes are commonly gentle and linear in profile.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Understory. Any plants in a forest community that grow to a height of less than 5 feet.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The action of uprooting and tipping over trees by the wind.

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United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
Montana Agricultural
Experiment Station

Soil Survey of Musselshell County, Montana Part II

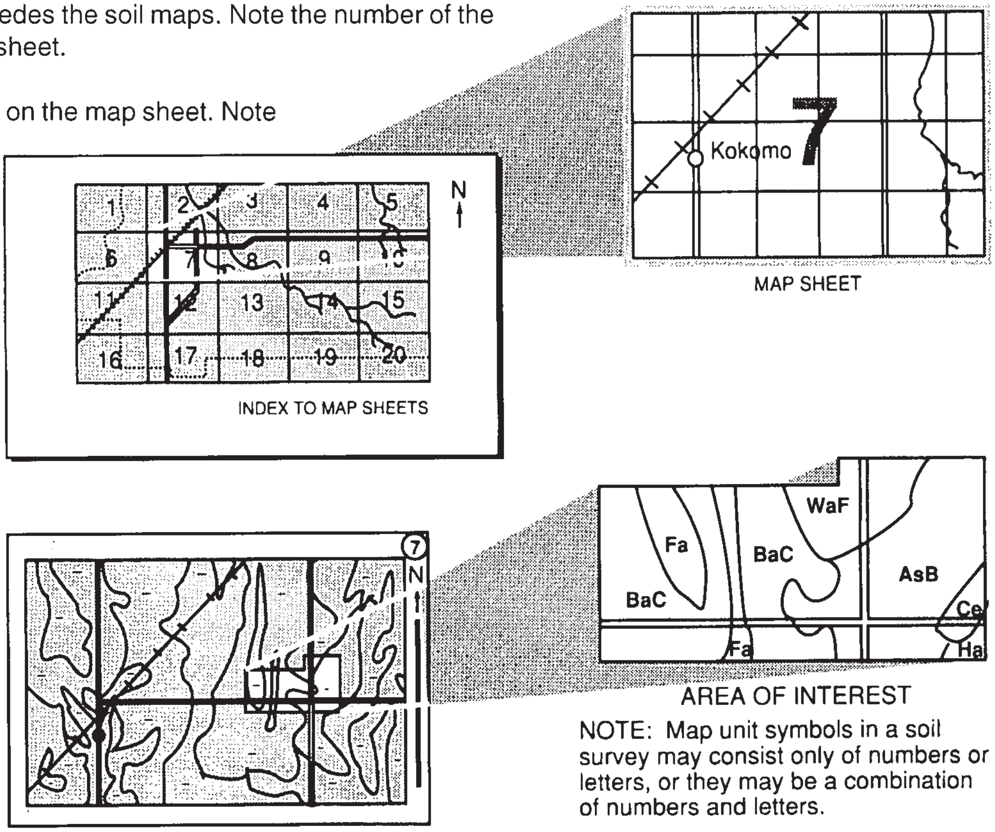
How to Use This Soil Survey

This survey is divided into three parts. Part I includes general information about the survey area; descriptions of the detailed soil map units and soil series in the area; and a description of how the soils formed. Part II describes the use and management of the soils and the major soil properties. This part may be updated as further information about soil management becomes available. Part III includes the maps.

Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets,** which precedes the soil maps. Note the number of the map sheet and turn to that sheet.



MAP SHEET

INDEX TO MAP SHEETS

AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

MAP SHEET

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** in Part I of this survey, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

A **State Soil Geographic Data Base** (STATSGO) is available for this survey area. This data base consists of a soils map at a scale of 1:250,000 along with groups of associated soils. It replaces the general soils map published in older surveys. This map and its data base can be useful for planning multi-county areas and map output can be tailored for specific use. For more information about the State Soil Geographic Data Base for this survey area, or for any portion of Montana, contact your local Natural Resources Conservation Service office.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1994. Soil names and descriptions were approved in 1995. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1994. This survey was made cooperatively by the Natural Resources Conservation Service and the Montana Agricultural Experiment Station. It is part of the technical assistance furnished to the Bureau of Land Management and the Lower Musselshell Conservation District. Financial assistance was provided by the Lower Musselshell Conservation District through the Montana Department of Natural Resources and Conservation.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover: The soils of Musselshell County are closely related to the landscape on which they occur. The soils in the foreground are Cabbart-Delpoint-Rock outcrop complex, 4-15 percent slopes.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov.

Contents

Part I

Index to Series
Numerical Index to Map Units
Summary of Tables
Foreword
Introduction
Formation and Classification of the Soils
Soil Series and Detailed Soil Map Units
References
Glossary

Part II

Detailed Soil Map Unit Legend 6
Summary of Tables 10
Introduction 13
Agronomy 21
  Cropland Limitations and Hazards 21
  Crop Yield Estimates 22
  Pasture and Hayland Interpretations 23
  Land Capability Classification 23
  Prime Farmland and Other Important Farmland 24
  Erosion Factors 25
  Windbreaks and Environmental Plantings 25
Range 93
  General Range Sites in Musselshell County 93
  Range Condition 95
  Rangeland Management 95
  Woodland Understory Vegetation 96
Forest Land 123
  Woodland Ordination System 124
  Forest Land Management and Productivity 125
  Forest Access Road Limitations and Hazards 125
Recreation 137
Wildlife Habitat 165
  Elements of Wildlife Habitat 165
  Kinds of Wildlife Habitat 165
  Wildlife of Musselshell County 166
Engineering 167
  Building Site Development 167
  Sanitary Facilities 168
  Waste Management 169
  Construction Materials 170
  Water Management 171
Soil Properties 275
  Engineering Index Properties 275
  Physical and Chemical Properties 276
  Water Features 277
  Soil Features 279
References 425
Glossary 427

Issued 2004

Detailed Soil Map Unit Legend

1E—Badland
2E—Rock outcrop
3A—Riverwash
5A—Harlake silty clay, 0 to 2 percent slopes
6A—Harlake silty clay, 0 to 2 percent slopes, occasionally flooded
7A—Lostriver silty clay, 0 to 2 percent slopes
7B—Lostriver-Bullhook complex, 0 to 2 percent slopes
8A—Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded
8B—Harlake-Havre complex, 0 to 2 percent slopes
9A—Havre loam, 0 to 2 percent slopes
9B—Havre-Yamacall loams, 0 to 4 percent slopes
10A—Havre loam, 0 to 2 percent slopes, occasionally flooded
11A—Havre-Glendive complex, 0 to 2 percent slopes
11B—Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded
12A—Havre-Harlake complex, channeled, 0 to 2 percent slopes
13A—Havre loam, calcareous, 0 to 2 percent slopes
14A—Havre, calcareous-Glendive complex, 0 to 2 percent slopes
14B—Havre, calcareous-Glendive complex, 0 to 2 percent slopes, occasionally flooded
15A—Havre-Harlake complex, calcareous, 0 to 2 percent slopes
16A—Havre-Yamacall loams, calcareous, 0 to 4 percent slopes
17A—Harlake-Havre complex, calcareous, 0 to 2 percent slopes
20B—Harlake-Marvan-Vanda silty clays, 0 to 4 percent slopes
21A—McKenzie silty clay, 0 to 2 percent slopes
22B—Nobe-Absher complex, 0 to 4 percent slopes
23A—Gerdrum-Vanda complex, 0 to 8 percent slopes
23B—Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes
23C—Gerdrum-Creed loams, 0 to 8 percent slopes
25A—Vanda silty clay, 0 to 4 percent slopes
26A—Weingart loam, 1 to 8 percent slopes
26B—Weingart-Warhorse loams, 1 to 8 percent slopes
30C—Busby fine sandy loam, 2 to 8 percent slopes
30D—Busby fine sandy loam, 8 to 15 percent slopes
31B—Delpoint loam, 2 to 8 percent slopes
31C—Delpoint-Cabbart-Yamacall loams, 4 to 15 percent slopes
32B—Twilight sandy loam, 2 to 8 percent slopes
32D—Twilight-Blacksheep-Rock outcrop complex, 4 to 25 percent slopes
33A—Yamacall loam, 0 to 2 percent slopes
33B—Yamacall loam, 2 to 8 percent slopes
34A—Yamacall clay loam, 0 to 2 percent slopes
34B—Yamacall clay loam, 2 to 8 percent slopes
35B—Yamacall-Busby complex, 2 to 8 percent slopes
36B—Yamacall-Delpoint loams, 2 to 8 percent slopes
37A—Yamacall clay loam, calcareous, 0 to 2 percent slopes
37B—Yamacall clay loam, calcareous, 2 to 8 percent slopes
38A—Kobase-Zatoville silty clay loams, 0 to 8 percent slopes
38B—Zatoville silty clay loam, 0 to 8 percent slopes
39B—Delpoint loam, calcareous, 2 to 8 percent slopes
39C—Delpoint, calcareous-Cabbart-Yamacall loams, 4 to 15 percent slopes
40B—Kobase silty clay loam, 0 to 8 percent slopes
40C—Kobase silty clay loam, calcareous, 0 to 8 percent slopes
41A—Yamacall loam, calcareous, 0 to 2 percent slopes

41B—Yamacall loam, calcareous, 2 to 8 percent slopes
41C—Yamacall-Delpoint loams, calcareous, 2 to 8 percent slopes
50B—Hinterland loam, 1 to 6 percent slopes
50C—Hinterland loam, 6 to 15 percent slopes
50D—Hinterland-Delplain complex, 8 to 25 percent slopes
51A—Ethridge clay loam, 0 to 2 percent slopes
51B—Ethridge clay loam, 2 to 8 percent slopes
52A—Eapa loam, 0 to 2 percent slopes
52B—Eapa loam, 2 to 8 percent slopes
53A—Tanna loam, 1 to 6 percent slopes
54A—Marmarth fine sandy loam, 0 to 8 percent slopes
56A—Crago-Musselshell-Attewan complex, 0 to 2 percent slopes
57A—Attewan loam, 0 to 4 percent slopes
57B—Attewan cobbly loam, 0 to 4 percent slopes
57C—Attewan-Niart loams, 0 to 4 percent slopes
58A—Verson clay loam, 0 to 4 percent slopes
60B—Abor silty clay, 1 to 8 percent slopes
60C—Abor-Neldore silty clays, 2 to 8 percent slopes
60D—Neldore-Abor silty clays, 4 to 15 percent slopes
60E—Neldore-Abor silty clays, 15 to 45 percent slopes
61D—Neldore-Neldore, saline silty clays, 4 to 25 percent slopes
61E—Neldore-Volborg silty clays, 4 to 25 percent slopes
62C—Neldore silty clay, 4 to 25 percent slopes
62D—Neldore-Yawdim silty clays, 4 to 25 percent slopes
62E—Neldore-Rock outcrop complex, 15 to 45 percent slopes
63A—Marias silty clay, 0 to 4 percent slopes
64A—Marvan-Vanda silty clays, 0 to 8 percent slopes
64B—Marvan silty clay, 0 to 8 percent slopes
67D—Yawdim silty clay loam, 4 to 25 percent slopes
68C—Megonot-Yawdim silty clay loams, 4 to 15 percent slopes
69C—Orinoco-Yawdim silty clay loams, 4 to 15 percent slopes
73D—Yawdim-Abor complex, 4 to 15 percent slopes
73E—Yawdim-Abor complex, 15 to 60 percent slopes
74D—Abor-Crago complex, 2 to 15 percent slopes
74E—Abor-Crago complex, 15 to 35 percent slopes
80E—Blacksheep-Rock outcrop-Twilight complex, 8 to 45 percent slopes
81B—Delpoint-Cabbart loams, 2 to 8 percent slopes
81C—Delpoint-Cabbart loams, 8 to 15 percent slopes
81D—Cabbart loam, 4 to 15 percent slopes
82B—Cabbart-Delpoint loams, 4 to 15 percent slopes
82C—Cabbart-Delpoint-Rock outcrop complex, 4 to 15 percent slopes
82E—Cabbart-Delpoint-Rock outcrop complex, 8 to 45 percent slopes
83D—Cabbart-Rock outcrop-Blacksheep complex, 8 to 45 percent slopes
84C—Cabbart-Yawdim-Delpoint complex, 4 to 15 percent slopes
84D—Cabbart-Yawdim-Rock outcrop complex, 4 to 35 percent slopes
84E—Cabbart-Yawdim-Delpoint complex, 15 to 35 percent slopes
85A—Cabbart clay loam, 0 to 2 percent slopes
86D—Cabbart-Rentsac complex, 2 to 15 percent slopes
86E—Cabbart-Rock outcrop complex, 4 to 35 percent slopes
87B—Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes

---

88D—Delpoint-Cabbart-Rock outcrop complex, 4 to 35 percent slopes
89C—Rentsac fine sandy loam, 2 to 8 percent slopes
90B—Chinook fine sandy loam, 2 to 8 percent slopes
91A—Kremlin loam, 0 to 2 percent slopes
91B—Kremlin loam, 2 to 8 percent slopes
92A—Binna loam, 0 to 4 percent slopes
93A—Crago-Musselshell complex, 0 to 4 percent slopes
93B—Crago cobbly loam, 1 to 6 percent slopes
94A—Crago gravelly loam, 0 to 8 percent slopes
94E—Crago gravelly loam, 8 to 35 percent slopes
95A—Crago-Musselshell cobbly loams, 0 to 4 percent slopes
95B—Crago-Attewan-Musselshell cobbly loams, 0 to 4 percent slopes
95C—Crago-Attewan cobbly loams, 2 to 8 percent slopes
95E—Yawdim-Crago complex, 4 to 35 percent slopes
96E—Crago-Abor complex, 4 to 35 percent slopes
97A—Musselshell-Crago cobbly loams, 0 to 4 percent slopes
97B—Musselshell-Crago complex, 4 to 8 percent slopes
98A—Niart cobbly loam, 0 to 4 percent slopes
98B—Niart-Crago complex, 0 to 4 percent slopes
98C—Niart-Crago complex, 4 to 15 percent slopes
98D—Niart-Rothiemay loams, 0 to 4 percent slopes
123C—Creed-Gerdrum loams, 0 to 8 percent slopes
130B—Busby-Twilight complex, 2 to 8 percent slopes
131C—Delpoint-Yamacall loams, 2 to 8 percent slopes
132B—Twilight-Blacksheep sandy loams, 2 to 8 percent slopes
138B—Zatoville-Orinoco silty clay loams, 2 to 8 percent slopes
140B—Kobase-Megonot silty clay loams, 0 to 8 percent slopes
140C—Kobase-Megonot silty clay loams, calcareous, 0 to 8 percent slopes
142A—Rothiemay loam, calcareous, 0 to 2 percent slopes
142B—Rothiemay loam, calcareous, 2 to 8 percent slopes
142C—Rothiemay-Crago complex, 4 to 15 percent slopes
152A—Eapa-Attewan loams, 0 to 2 percent slopes
153C—Tanna-Cabbart loams, 2 to 8 percent slopes
153D—Cabbart-Tanna loams, 4 to 15 percent slopes
154C—Marmarth-Cabbart loams, 2 to 8 percent slopes
154D—Cabbart-Marmarth complex, 4 to 15 percent slopes
158A—Ethridge-Verson clay loams, 0 to 2 percent slopes
167D—Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes
167E—Yawdim-Orinoco silty clay loams, 15 to 35 percent slopes
181D—Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes
181E—Cabbart-Crago-Delpoint complex, 15 to 35 percent slopes
189C—Rentsac-Cabbart complex, 2 to 15 percent slopes
189E—Rentsac-Rock outcrop complex, 15 to 45 percent slopes
230C—Macar loam, 2 to 8 percent slopes
232E—Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes
234F—Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes

240E—Ridge-Dast-Rock outcrop complex, 4 to 35 percent slopes
241E—Twilight-Blacksheep-Rock outcrop complex, 4 to 35 percent slopes
242D—Dast-Ridge sandy loams, 2 to 8 percent slopes
242F—Ridge-Dast sandy loams, 8 to 45 percent slopes
243F—Blacksheep-Twilight sandy loams, 8 to 45 percent slopes
245C—Lamedeer-Ringling channery loams, 2 to 8 percent slopes
245F—Lamedeer-Ringling channery loams, 4 to 45 percent slopes
246F—Lamedeer-Ringling channery loams, moist, 4 to 45 percent slopes
250E—Macmeal-Rock outcrop complex, 4 to 35 percent slopes
251C—Savage loam, 2 to 8 percent slopes
252D—Hilger-Rock outcrop complex, 4 to 35 percent slopes
252E—Hilger stony loam, 4 to 25 percent slopes
254C—Fergus clay loam, 2 to 8 percent slopes
255C—Shambo-Korchea-Barvon loams, 2 to 8 percent slopes
255D—Barvon-Cabba-Shambo loams, 4 to 15 percent slopes
256C—Yamacall-Havre-Delpoint loams, 2 to 8 percent slopes
260F—Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes
261F—Wayden-Castner complex, 8 to 45 percent slopes
262E—Wayden-Windham complex, 4 to 25 percent slopes
280D—Cabbart, moist-Delpoint, dry loams, 4 to 15 percent slopes
280E—Castner-Kuro complex, 4 to 25 percent slopes
281D—Doney-Cabba-Macar loams, 4 to 15 percent slopes
281E—Castner-Rock outcrop complex, 8 to 45 percent slopes
282D—Castner channery loam, 4 to 25 percent slopes
283D—Barvon-Cabba loams, 2 to 8 percent slopes
283F—Cabba-Rock outcrop complex, 8 to 45 percent slopes
284D—Cabba-Barvon loams, 4 to 15 percent slopes
284F—Doney-Wayden complex, 15 to 60 percent slopes
285D—Cabba-Doney loams, 4 to 15 percent slopes
285F—Cabba-Doney loams, 8 to 45 percent slopes
286F—Cabbart-Rock outcrop complex, 8 to 45 percent slopes
287D—Delpoint, dry-Cabbart, moist loams, 2 to 8 percent slopes
287F—Cabbart, moist-Delpoint, dry loams, 8 to 45 percent slopes
288D—Delpoint-Cabbart-Havre loams, 4 to 25 percent slopes
288F—Cabbart-Delpoint loams, 15 to 65 percent slopes
289D—Barvon-Cabba-Korchea loams, 3 to 25 percent slopes
289F—Cabba-Barvon loams, 15 to 65 percent slopes
291C—Windham very stony loam, 2 to 15 percent slopes
292A—Straw-Korchea loams, 0 to 2 percent slopes
294C—Shambo loam, 2 to 8 percent slopes
295F—Bitton-Winifred-Castner complex, 15 to 60 percent slopes
296D—Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes
DA—Denied access
UL—Urban land
W—Water

Summary of Tables

Part I (For page numbers, see "Summary of Tables" in Part I)

Temperature and Precipitation

Freeze Dates in Spring and Fall

Growing Season

Classification of the Soils

Acreage and Proportionate Extent of the Soils

Part II

Classification of the Soils 14

Acreage and Proportionate Extent of the Soils 16

Main Cropland Limitations and Hazards 28

Land Capability and Yields per Acre of Crops 64

Prime Farmland 79

Windbreak Suitability Group Species 80

Windbreak Suitability Groups 81

Range Site Names 97

Range Site Species List 108

Woodland Understory Vegetation and Habitat Types 112

Forest Land Management 127

Forest Land Productivity 130

Main Forest Access Road Limitations and Hazards 133

Recreational Development 139
Building Site Development 173
Sanitary Facilities 199
Construction Materials 224
Water Management 250
Engineering Index Properties 281
Physical Properties of the Soils 340
Chemical Properties of the Soils 367
Water Features 394
Soil Features 409

Soil Survey of Musselshell County, Montana

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Interpretive ratings help engineers, planners, and others understand how soil properties influence important nonagricultural uses, such as building site development and construction materials. The ratings indicate the most restrictive soil features affecting the suitability of the soils for these uses.

Soils are rated in their natural state. No unusual modification of the soil site or material is made other than that which is considered normal practice for the rated use. Even though soils may have limitations, it is important to remember that engineers and others can modify soil features or can design or adjust the plans for a structure to compensate for most of the limitations. Most of these practices, however, are costly. The final decision in selecting a site for a particular use generally involves weighing the costs of site preparation and maintenance.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

The classification and extent of the soils in this survey area are shown in the tables "Classification of the Soils" and "Acreage and Proportionate Extent of the Soils," which are at the end of this section.

Classification of the Soil

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics outside the range of the series.)

Soil name	Family or higher taxonomic class
Abor	Fine, smectitic, frigid Leptic Udic Haplusterts
Absher	Fine, smectitic, frigid Torrertic Natrustalfs
Attewan	Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aridic Argiborolls
Barvon	Fine-loamy, mixed, superactive Entic Haploborolls
Binna	Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aridic Calciborolls
Bitton	Loamy-skeletal, mixed, superactive Typic Haploborolls
Blacksheep	Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents
Borky	Clayey-skeletal, mixed, superactive Typic Argiborolls
Bullhook	Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Busby	Coarse-loamy, mixed, superactive, frigid Aridic Ustochrepts
Cabba	Loamy, mixed, calcareous, superactive, frigid, shallow Typic Ustorthents
Cabbart	Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents
Castner	Loamy-skeletal, mixed, superactive Lithic Haploborolls
Chinook	Coarse-loamy, mixed, superactive Aridic Haploborolls
Crago	Loamy-skeletal, carbonatic, frigid Haplocalcidic Ustochrepts
Creed	Fine, smectitic, frigid Aridic Natrustalfs
Dast	Coarse-loamy, mixed, superactive, frigid Typic Ustochrepts
Delplain	Clayey-skeletal, mixed, nonacid, superactive, frigid Lithic Ustorthents
Delpoint	Fine-loamy, mixed, superactive, frigid Aridic Ustochrepts
Doney	Fine-loamy, mixed, superactive, frigid Typic Ustochrepts
Eapa	Fine-loamy, mixed, superactive Aridic Argiborolls
Ethridge	Fine, smectitic Torrertic Argiborolls
Fergus	Fine, mixed, superactive Typic Argiborolls
Gerdrum	Fine, smectitic, frigid Torrertic Natrustalfs
Glendive	Coarse-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Harlake	Fine, smectitic, calcareous, frigid Aridic Ustifluvents
Havre	Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents
Hilger	Loamy-skeletal, mixed, superactive Typic Argiborolls
Hinterland	Clayey, smectitic Lithic Argiborolls
*Hughesville	Loamy-skeletal, carbonatic Udic Haploborolls
Kobase	Fine, smectitic, frigid Torrertic Ustochrepts
Korchea	Fine-loamy, mixed, superactive, calcareous, frigid Mollic Ustifluvents
Kremlin	Fine-loamy, mixed, superactive Aridic Haploborolls
Kuro	Clayey, mixed, superactive, calcareous, frigid, shallow Typic Ustorthents
Lamedeer	Loamy-skeletal, mixed, superactive, frigid Typic Ustochrepts
Lostriver	Fine, smectitic, calcareous, frigid Aridic Ustifluvents
Macar	Fine-loamy, mixed, superactive, frigid Typic Ustochrepts
Macmeal	Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs
Marias	Fine, smectitic, frigid Chromic Udic Haplusterts
Marmarth	Fine-loamy, mixed, superactive Aridic Argiborolls
Marvan	Fine, smectitic, frigid Sodic Haplusterts
McKenzie	Fine, smectitic, frigid Chromic Endoaquerts

Classification of the Soil--Continued

Soil name	Family or higher taxonomic class
Megonot	Fine, smectitic, frigid Torrertic Ustochrepts
Musselshell	Coarse-loamy, carbonatic, frigid Haplocalcidic Ustochrepts
Neldore	Clayey, smectitic, nonacid, frigid, shallow Aridic Ustorthents
Niart	Fine-loamy, carbonatic Aridic Calciborolls
Nobe	Fine, smectitic, calcareous, frigid Vertic Ustorthents
Orinoco	Fine, smectitic, calcareous, frigid Vertic Ustorthents
Rentsac	Loamy-skeletal, mixed, superactive, calcareous, frigid Lithic Ustorthents
Ridge	Loamy, mixed, superactive, frigid, shallow Typic Ustochrepts
Ringling	Loamy-skeletal over fragmental, mixed, superactive Typic Haploborolls
Rothiemay	Fine-loamy, mixed, superactive Aridic Calciborolls
Savage	Fine, smectitic Vertic Argiborolls
Shambo	Fine-loamy, mixed, superactive Typic Haploborolls
Sinnigam	Clayey-skeletal, mixed, superactive Lithic Argiborolls
Straw	Fine-loamy, mixed, superactive Cumulic Haploborolls
Tanna	Fine, smectitic Aridic Argiborolls
Tibs	Clayey-skeletal, mixed, superactive, calcareous, frigid Typic Ustorthents
Twilight	Coarse-loamy, mixed, superactive, frigid Aridic Ustochrepts
Vanda	Fine, smectitic, calcareous, frigid Vertic Ustorthents
Verson	Clayey over loamy-skeletal, mixed, superactive Aridic Argiborolls
Volborg	Clayey, smectitic, acid, frigid, shallow Aridic Ustorthents
Warhorse	Clayey, smectitic, frigid, shallow Aridic Haplustalfs
Wayden	Clayey, smectitic, calcareous, frigid, shallow Typic Ustorthents
Weingart	Fine, smectitic, frigid Torrertic Natrustalfs
Whitecow	Loamy-skeletal, carbonatic, frigid Calcic Ustochrepts
Windham	Loamy-skeletal, carbonatic Typic Calciborolls
Winifred	Fine, smectitic Vertic Haploborolls
Yamacall	Fine-loamy, mixed, superactive, frigid Aridic Ustochrepts
Yawdim	Clayey, smectitic, calcareous, frigid, shallow Aridic Ustorthents
Zatoville	Fine, smectitic, frigid Torrertic Ustochrepts

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
1E	Badland	1,158	*
2E	Rock outcrop	750	*
3A	Riverwash	295	*
5A	Harlake silty clay, 0 to 2 percent slopes	717	*
6A	Harlake silty clay, 0 to 2 percent slopes, occasionally flooded	18	*
7A	Lostriver silty clay, 0 to 2 percent slopes	1,282	0.1
7B	Lostriver-Bullhook complex, 0 to 2 percent slopes	3,768	0.3
8A	Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded	2,560	0.2
8B	Harlake-Havre complex, 0 to 2 percent slopes	2,300	0.2
9A	Havre loam, 0 to 2 percent slopes	4,143	0.3
9B	Havre-Yamacall loams, 0 to 4 percent slopes	5,689	0.5
10A	Havre loam, 0 to 2 percent slopes, occasionally flooded	519	*
11A	Havre-Glendive complex, 0 to 2 percent slopes	5,093	0.4
11B	Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded	566	*
12A	Havre-Harlake complex, channeled, 0 to 2 percent slopes	5,856	0.5
13A	Havre loam, calcareous, 0 to 2 percent slopes	3,974	0.3
14A	Havre, calcareous-Glendive complex, 0 to 2 percent slopes	1,841	0.2
14B	Havre, calcareous-Glendive complex, 0 to 2 percent slopes, occasionally flooded	401	*
15A	Havre-Harlake complex, calcareous, 0 to 2 percent slopes	1,025	*
16A	Havre-Yamacall loams, calcareous, 0 to 4 percent slopes	1,137	*
17A	Harlake-Havre complex, calcareous, 0 to 2 percent slopes	714	*
20B	Harlake-Marvan-Vanda silty clays, 0 to 4 percent slopes	2,690	0.2
21A	McKenzie silty clay, 0 to 2 percent slopes	3,482	0.3
22B	Nobe-Absher complex, 0 to 4 percent slopes	5,515	0.5
23A	Gerdrum-Vanda complex, 0 to 8 percent slopes	16,076	1.3
23B	Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes	19,053	1.6
23C	Gerdrum-Creed loams, 0 to 8 percent slopes	7,754	0.6
25A	Vanda silty clay, 0 to 4 percent slopes	2,918	0.2
26A	Weingart loam, 1 to 8 percent slopes	1,199	0.1
26B	Weingart-Warhorse loams, 1 to 8 percent slopes	214	*
30C	Busby fine sandy loam, 2 to 8 percent slopes	2,531	0.2
30D	Busby fine sandy loam, 8 to 15 percent slopes	609	*
31B	Delpoint loam, 2 to 8 percent slopes	5,164	0.4
31C	Delpoint-Cabbart-Yamacall loams, 4 to 15 percent slopes	25,801	2.2
32B	Twilight sandy loam, 2 to 8 percent slopes	3,356	0.3
32D	Twilight-Blacksheep-Rock outcrop complex, 4 to 25 percent slopes	7,044	0.6
33A	Yamacall loam, 0 to 2 percent slopes	1,854	0.2
33B	Yamacall loam, 2 to 8 percent slopes	12,567	1.0
34A	Yamacall clay loam, 0 to 2 percent slopes	896	*
34B	Yamacall clay loam, 2 to 8 percent slopes	3,076	0.3
35B	Yamacall-Busby complex, 2 to 8 percent slopes	5,490	0.5
36B	Yamacall-Delpoint loams, 2 to 8 percent slopes	21,257	1.8
37A	Yamacall clay loam, calcareous, 0 to 2 percent slopes	953	*
37B	Yamacall clay loam, calcareous, 2 to 8 percent slopes	888	*
38A	Kobase-Zatoville silty clay loams, 0 to 8 percent slopes	7,262	0.6
38B	Zatoville silty clay loam, 0 to 8 percent slopes	5,915	0.5
39B	Delpoint loam, calcareous, 2 to 8 percent slopes	1,174	*
39C	Delpoint, calcareous-Cabbart-Yamacall loams, 4 to 15 percent slopes	14,964	1.2
40B	Kobase silty clay loam, 0 to 8 percent slopes	7,535	0.6
40C	Kobase silty clay loam, calcareous, 0 to 8 percent slopes	2,399	0.2
41A	Yamacall loam, calcareous, 0 to 2 percent slopes	2,017	0.2
41B	Yamacall loam, calcareous, 2 to 8 percent slopes	7,140	0.6
41C	Yamacall-Delpoint loams, calcareous, 2 to 8 percent slopes	7,930	0.7
50B	Hinterland loam, 1 to 6 percent slopes	1,579	0.1
50C	Hinterland loam, 6 to 15 percent slopes	421	*
50D	Hinterland-Delplain complex, 8 to 25 percent slopes	1,316	0.1
51A	Ethridge clay loam, 0 to 2 percent slopes	3,351	0.3
51B	Ethridge clay loam, 2 to 8 percent slopes	5,621	0.5
52A	Eapa loam, 0 to 2 percent slopes	1,607	0.1
52B	Eapa loam, 2 to 8 percent slopes	7,655	0.6

* See footnote at end of table

Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
53A	Tanna loam, 1 to 6 percent slopes	1,127	*
54A	Marmarth fine sandy loam, 0 to 8 percent slopes	2,604	0.2
56A	Crago-Musselshell-Attewan complex, 0 to 2 percent slopes	15,330	1.3
57A	Attewan loam, 0 to 4 percent slopes	2,522	0.2
57B	Attewan cobbly loam, 0 to 4 percent slopes	46	*
57C	Attewan-Niart loams, 0 to 4 percent slopes	3,828	0.3
58A	Verson clay loam, 0 to 4 percent slopes	3,465	0.3
60B	Abor silty clay, 1 to 8 percent slopes	7,614	0.6
60C	Abor-Neldore silty clays, 2 to 8 percent slopes	20,097	1.7
60D	Neldore-Abor silty clays, 4 to 15 percent slopes	28,989	2.4
60E	Neldore-Abor silty clays, 15 to 45 percent slopes	1,270	0.1
61D	Neldore-Neldore, saline silty clays, 4 to 25 percent slopes	6,396	0.5
61E	Neldore-Volborg silty clays, 4 to 25 percent slopes	2,785	0.2
62C	Neldore silty clay, 4 to 25 percent slopes	1,602	0.1
62D	Neldore-Yawdim silty clays, 4 to 25 percent slopes	7,827	0.7
62E	Neldore-Rock outcrop complex, 15 to 45 percent slopes	3,046	0.3
63A	Marias silty clay, 0 to 4 percent slopes	7,888	0.7
64A	Marvan-Vanda silty clays, 0 to 8 percent slopes	21,460	1.8
64B	Marvan silty clay, 0 to 8 percent slopes	13,570	1.1
67D	Yawdim silty clay loam, 4 to 25 percent slopes	2,383	0.2
68C	Megonot-Yawdim silty clay loams, 4 to 15 percent slopes	4,093	0.3
69C	Orinoco-Yawdim silty clay loams, 4 to 15 percent slopes	1,888	0.2
73D	Yawdim-Abor complex, 4 to 15 percent slopes	4,288	0.4
73E	Yawdim-Abor complex, 15 to 60 percent slopes	1,589	0.1
74D	Abor-Crago complex, 2 to 15 percent slopes	5,722	0.5
74E	Abor-Crago complex, 15 to 35 percent slopes	9,807	0.8
80E	Blacksheep-Rock outcrop-Twilight complex, 8 to 45 percent slopes	1,046	*
81B	Delpoint-Cabbart loams, 2 to 8 percent slopes	19,577	1.6
81C	Delpoint-Cabbart loams, 8 to 15 percent slopes	2,329	0.2
81D	Cabbart loam, 4 to 15 percent slopes	3,857	0.3
82B	Cabbart-Delpoint loams, 4 to 15 percent slopes	34,868	2.9
82C	Cabbart-Delpoint-Rock outcrop complex, 4 to 15 percent slopes	21,206	1.8
82E	Cabbart-Delpoint-Rock outcrop complex, 8 to 45 percent slopes	15,840	1.3
83D	Cabbart-Rock outcrop-Blacksheep complex, 8 to 45 percent slopes	5,453	0.5
84C	Cabbart-Yawdim-Delpoint complex, 4 to 15 percent slopes	10,048	0.8
84D	Cabbart-Yawdim-Rock outcrop complex, 4 to 35 percent slopes	14,416	1.2
84E	Cabbart-Yawdim-Delpoint complex, 15 to 35 percent slopes	2,764	0.2
85A	Cabbart clay loam, 0 to 2 percent slopes	682	*
86D	Cabbart-Rentsac complex, 2 to 15 percent slopes	2,649	0.2
86E	Cabbart-Rock outcrop complex, 4 to 35 percent slopes	2,125	0.2
87B	Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes	5,013	0.4
88D	Delpoint-Cabbart-Rock outcrop complex, 4 to 35 percent slopes	1,630	0.1
89C	Rentsac fine sandy loam, 2 to 8 percent slopes	2,886	0.2
90B	Chinook fine sandy loam, 2 to 8 percent slopes	799	*
91A	Kremlin loam, 0 to 2 percent slopes	119	*
91B	Kremlin loam, 2 to 8 percent slopes	659	*
92A	Binna loam, 0 to 4 percent slopes	4,816	0.4
93A	Crago-Musselshell complex, 0 to 4 percent slopes	6,741	0.6
93B	Crago cobbly loam, 1 to 6 percent slopes	535	*
94A	Crago gravelly loam, 0 to 8 percent slopes	1,901	0.2
94E	Crago gravelly loam, 8 to 35 percent slopes	1,119	*
95A	Crago-Musselshell cobbly loams, 0 to 4 percent slopes	6,191	0.5
95B	Crago-Attewan-Musselshell cobbly loams, 0 to 4 percent slopes	434	*
95C	Crago-Attewan cobbly loams, 2 to 8 percent slopes	901	*
95E	Yawdim-Crago complex, 4 to 35 percent slopes	8,369	0.7
96E	Crago-Abor complex, 4 to 35 percent slopes	1,636	0.1
97A	Musselshell-Crago cobbly loams, 0 to 4 percent slopes	3,945	0.3
97B	Musselshell-Crago complex, 4 to 8 percent slopes	1,499	0.1
98A	Niart cobbly loam, 0 to 4 percent slopes	7,895	0.7
98B	Niart-Crago complex, 0 to 4 percent slopes	58	*
98C	Niart-Crago complex, 4 to 15 percent slopes	1,446	0.1

Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
98D	Niart-Rothiemay loams, 0 to 4 percent slopes	921	*
123C	Creed-Gerdrum loams, 0 to 8 percent slopes	2,925	0.2
130B	Busby-Twilight complex, 2 to 8 percent slopes	105	*
131C	Delpoint-Yamacall loams, 2 to 8 percent slopes	8,388	0.7
132B	Twilight-Blacksheep sandy loams, 2 to 8 percent slopes	15,199	1.3
138B	Zatoville-Orinoco silty clay loams, 2 to 8 percent slopes	3,580	0.3
140B	Kobase-Megonot silty clay loams, 0 to 8 percent slopes	4,236	0.4
140C	Kobase-Megonot silty clay loams, calcareous, 0 to 8 percent slopes	559	*
142A	Rothiemay loam, calcareous, 0 to 2 percent slopes	23	*
142B	Rothiemay loam, calcareous, 2 to 8 percent slopes	42	*
142C	Rothiemay-Crago complex, 4 to 15 percent slopes	1,025	*
152A	Eapa-Attewan loams, 0 to 2 percent slopes	3,124	0.3
153C	Tanna-Cabbart loams, 2 to 8 percent slopes	1,112	*
153D	Cabbart-Tanna loams, 4 to 15 percent slopes	1,269	0.1
154C	Marmarth-Cabbart loams, 2 to 8 percent slopes	2,922	0.2
154D	Cabbart-Marmarth complex, 4 to 15 percent slopes	1,431	0.1
158A	Ethridge-Verson clay loams, 0 to 2 percent slopes	1,886	0.2
167D	Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes	7,423	0.6
167E	Yawdim-Orinoco silty clay loams, 15 to 35 percent slopes	2,430	0.2
181D	Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes	5,316	0.4
181E	Cabbart-Crago-Delpoint complex, 15 to 35 percent slopes	9,463	0.8
189C	Rentsac-Cabbart complex, 2 to 15 percent slopes	3,192	0.3
189E	Rentsac-Rock outcrop complex, 15 to 45 percent slopes	1,965	0.2
230C	Macar loam, 2 to 8 percent slopes	5,853	0.5
232E	Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes	910	*
234F	Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes	131	*
240E	Ridge-Dast-Rock outcrop complex, 4 to 35 percent slopes	8,358	0.7
241E	Twilight-Blacksheep-Rock outcrop complex, 4 to 35 percent slopes	9,325	0.8
242D	Dast-Ridge sandy loams, 2 to 8 percent slopes	3,842	0.3
242F	Ridge-Dast sandy loams, 8 to 45 percent slopes	13,546	1.1
243F	Blacksheep-Twilight sandy loams, 8 to 45 percent slopes	10,867	0.9
245C	Lamedeer-Ringling channery loams, 2 to 8 percent slopes	817	*
245F	Lamedeer-Ringling channery loams, 4 to 45 percent slopes	1,256	0.1
246F	Lamedeer-Ringling channery loams, moist, 4 to 45 percent slopes	2,107	0.2
250E	Macmeal-Rock outcrop complex, 4 to 35 percent slopes	543	*
251C	Savage loam, 2 to 8 percent slopes	61	*
252D	Hilger-Rock outcrop complex, 4 to 35 percent slopes	385	*
252E	Hilger stony loam, 4 to 25 percent slopes	582	*
254C	Fergus clay loam, 2 to 8 percent slopes	593	*
255C	Shambo-Korchea-Barvon loams, 2 to 8 percent slopes	12,214	1.0
255D	Barvon-Cabba-Shambo loams, 4 to 15 percent slopes	6,939	0.6
256C	Yamacall-Havre-Delpoint loams, 2 to 8 percent slopes	15,258	1.3
260F	Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes	79	*
261F	Wayden-Castner complex, 8 to 45 percent slopes	745	*
262E	Wayden-Windham complex, 4 to 25 percent slopes	96	*
280D	Cabbart, moist-Delpoint, dry loams, 4 to 15 percent slopes	29,922	2.5
280E	Castner-Kuro complex, 4 to 25 percent slopes	466	*
281D	Doney-Cabba-Macar loams, 4 to 15 percent slopes	17,193	1.4
281E	Castner-Rock outcrop complex, 8 to 45 percent slopes	339	*
282D	Castner channery loam, 4 to 25 percent slopes	2,078	0.2
283D	Barvon-Cabba loams, 2 to 8 percent slopes	11,046	0.9
283F	Cabba-Rock outcrop complex, 8 to 45 percent slopes	28,372	2.4
284D	Cabba-Barvon loams, 4 to 15 percent slopes	17,944	1.5
284F	Doney-Wayden complex, 15 to 60 percent slopes	186	*
285D	Cabba-Doney loams, 4 to 15 percent slopes	14,472	1.2
285F	Cabba-Doney loams, 8 to 45 percent slopes	37,818	3.2
286F	Cabbart-Rock outcrop complex, 8 to 45 percent slopes	27,341	2.3
287D	Delpoint, dry-Cabbart, moist loams, 2 to 8 percent slopes	11,169	0.9
287F	Cabbart, moist-Delpoint, dry loams, 8 to 45 percent slopes	33,649	2.8
288D	Delpoint-Cabbart-Havre loams, 4 to 25 percent slopes	5,740	0.5
288F	Cabbart-Delpoint loams, 15 to 65 percent slopes	21,969	1.8

* See footnote at end of table

Acreage and Proportionate Extent of the Soils—Continued

Map symbol	Soil name	Acres	Percent
289D	Barvon-Cabba-Korchea loams, 3 to 25 percent slopes	9,627	0.8
289F	Cabba-Barvon loams, 15 to 65 percent slopes	75,019	6.3
291C	Windham very stony loam, 2 to 15 percent slopes	1,960	0.2
292A	Straw-Korchea loams, 0 to 2 percent slopes	5,329	0.4
294C	Shambo loam, 2 to 8 percent slopes	2,298	0.2
295F	Bitton-Winifred-Castner complex, 15 to 60 percent slopes	530	*
296D	Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes	1,039	*
DA	Denied access	17,129	1.4
UL	Urban land	455	*
W	Water	2,300	0.2
	Total	1,197,200	100.0

* Less than 0.1 percent.

Agronomy

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Natural Resources Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider obtaining specific information from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Cropland Limitations and Hazards

The management concerns affecting the use of the detailed soil map units in the survey area for crops are shown in the table "Main Cropland Limitations and Hazards." The main concerns in managing nonirrigated cropland are conserving moisture, controlling soil blowing and water erosion, and maintaining soil fertility.

Conserving moisture consists primarily of reducing the evaporation and runoff rates and increasing the water infiltration rate. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

Generally, a combination of several practices is needed to control *soil blowing* and *water erosion*. Conservation tillage, stripcropping, field windbreaks, tall grass barriers, contour farming, conservation cropping systems, crop residue management, diversions, and grassed waterways help to prevent excessive soil loss.

Measures that are effective in maintaining *soil fertility* include applying fertilizer, both organic and inorganic, including manure; incorporating crop residue or green manure crops into the soil; and using proper crop rotations. Controlling erosion helps to prevent the loss of organic matter and plant nutrients and thus helps to maintain productivity, although the level of fertility can be reduced even in areas where erosion is controlled. All soils used for nonirrigated crops respond well to applications of fertilizer.

Some of the limitations and hazards shown in the table cannot be easily overcome. These are *channels, flooding, depth to rock, ponding, gullies,* and *lack of timely precipitation*.

Additional limitations and hazards are as follows:

Areas of rock outcrop and slick spots.—Farming around these areas may be feasible. Subsoiling or deep ripping soft sedimentary beds increases the effective rooting depth and the rate of water infiltration.

Excessive permeability.—This limitation causes deep leaching of nutrients and pesticides. The capacity of the soil to retain moisture for plant use is poor.

Lime content, limited available water capacity, poor tilth, restricted permeability, and *surface crusting.*—These limitations can be overcome by incorporating green manure crops, manure, or crop residue into the soil; applying a system of conservation tillage; and using conservation cropping systems. Also, crops may respond well to additions of phosphate fertilizer to soils that have a high content of lime.

Potential for ground-water pollution.—This is a hazard in soils with excessive permeability, hard bedrock, or a water table within the profile.

Short frost-free period.—If the growing season is less than 90 days, short-season crops or grasses should be grown.

Surface rock fragments.—This limitation causes rapid wear of tillage equipment. It cannot be easily overcome.

Slope.—Where the slope is more than 8 percent, water erosion and soil blowing may be accelerated unless conservation farming practices are applied.

Surface stones.—Stones or boulders on the surface can hinder normal tillage unless they are removed.

Salt and sodium content.—In areas where this is a limitation, only salt- and sodium-tolerant crops should be grown.

On irrigated soils the main management concerns are *efficient water use, nutrient management, control of erosion, pest and weed control,* and *timely planting and harvesting* for a successful crop. An irrigation system that provides optimum control and distribution of water at minimum cost is needed. Overirrigation wastes water, leaches plant nutrients, and causes erosion.

Also, it can create drainage problems, raise the water table, and increase soil salinity.

Following is an explanation of the criteria used to determine the limitations or hazards.

Areas of rock outcrop.—Rock outcrop is a named component of the map unit.

Areas of rubble land.—Rubble land is a named component of the map unit.

Areas of slick spots.—Slick spots are a named component of the map unit.

Channeled.—The word "channeled" is included in the name of the map unit.

Depth to rock.—Bedrock is within a depth of 40 inches.

Excessive permeability.—The upper limit of the permeability range is 6 inches or more within the soil profile.

Flooding.—The component of the map unit is occasionally flooded or frequently flooded.

Gullied.—The word "gullied" is included in the name of the map unit.

Lack of timely precipitation.—The component of the map unit has a Xeric moisture regime. The amount of annual precipitation is no more than 14 inches.

Lime content.—The component is assigned to wind erodibility group 4L or has more than 5 percent lime in the upper 10 inches.

Limited available water capacity.—The available water capacity calculated to a depth of 60 inches or to a root-limiting layer is 5 inches or less.

Ponding.—Ponding duration is assigned to the component of the map unit.

Potential for ground-water pollution.—The soil has a water table within a depth of 4 feet or hard bedrock within the profile, or permeability is more than 6 inches per hour within the soil.

Poor tilth.—The component of the map unit has more than 35 percent clay in the surface layer.

Restricted permeability.—Permeability is 0.06 inch per hour or less within the soil profile.

Salt content.—The component of the map unit has an electrical conductivity of more than 4 in the surface layer or more than 8 within a depth of 30 inches.

Short frost-free period.—The map unit has a growing season of less than 90 frost-free days.

Slope.—The upper slope range of the component of the map unit is more than 8 percent.

Sodium content.—The sodium adsorption ratio of the component of the map unit is more than 13 within a depth of 30 inches.

Soil blowing.—The wind erodibility index multiplied by the selected high C factor for the survey area and then divided by the T factor is more than 8 for the component of the map unit.

Surface rock fragments.—The terms describing the texture of the surface layer include any rock fragment modifier except for gravelly or channery, and "surface stones" is not already indicated as a limitation.

Surface crusting.—The sodium adsorption ratio in the surface layer is 5 or more for any texture and 4 or more if the texture is silt, silt loam, loam, or very fine sandy loam.

Surface stones.—The terms describing the texture of the surface layer include any stony or bouldery modifier, or the soil is a stony or bouldery phase.

Water erosion.—The surface K factor multiplied by the upper slope limit is more than 2 (same as prime farmland criteria).

Water table.—The component of the map unit has a water table within a depth of 60 inches.

Crop Yield Estimates

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the table "Land Capability and Yields per Acre of Crops." In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss. Yields for dryland crops are based on a crop-fallow system.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Pasture and Hayland Interpretations

Under good management, proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain sufficient and generally vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing and renovation also are important management practices.

Yield estimates are often indicated in animal unit months (AUM), or the amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about forage yields other than those shown in the table "Land Capability and Yields per Acre of Crops."

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, or for engineering purposes.

In the capability system, as described in "Land Capability Classification" (USDA, 1961), soils generally are grouped at three levels—capability class, subclass, and unit. These levels indicate the degree and kinds of limitations affecting mechanized farming systems that produce the more commonly grown field crops, such as corn, small grain, cotton, hay, and field-grown vegetables. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use.

If properly managed, soils in classes 1, 2, 3, and 4 are suitable for the mechanized production of commonly grown field crops and for pasture and woodland. The degree of the soil limitations affecting the production of cultivated crops increases progressively from class 1 to class 5. The limitations can affect levels of production and the risk of permanent soil deterioration caused by erosion and other factors.

Soils in classes 5, 6, and 7 are generally not suited to the mechanized production of commonly grown field crops without special management, but they are suitable for plants that provide a permanent cover, such as grasses and trees. The severity of the soil limitations affecting crops increases progressively from class 5 to class 7. The local office of the Cooperative Extension Service or the Natural Resources Conservation Service can provide guidance on the use of these soils as cropland.

Areas in class 8 are generally not suitable for crops, pasture, or woodland without a level of management that is impractical. These areas may have potential for other uses, such as recreational facilities and wildlife habitat.

Capability subclasses indicate the dominant limitations in the class. They are designated by adding a letter, *E, W, S,* or *C,* to the class numeral, for example, 2E. The letter *E* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *W* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *S* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *C,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class 1 because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *W, S,* or *C* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use mainly to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the table "Land Capability and Yields per Acre of Crops" at the end of this section.

Prime Farmland and Other Important Farmland

In this section, prime farmland and other important farmland are defined. The soils in the survey area that are considered prime farmland are listed in the table "Prime Farmland" at the end of this section.

Prime Farmland

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. An adequate moisture supply and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils commonly receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable, and the level of acidity or alkalinity and the content of salts and sodium are acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods, and they are not frequently flooded during the growing season or are protected from flooding. Slopes range mainly from 0 to 6 percent.

Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland where these limitations are overcome by drainage measures, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information about the criteria for prime farmland can be obtained at the local office of the Natural Resources Conservation Service.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

The map units in the survey area that meet the requirements for prime farmland are listed in the table "Prime Farmland." On some soils included in the table, measures that overcome limitations are needed. The need for these measures is indicated in parentheses after the map unit name. The location of each map unit is shown on the detailed soil maps in Part III of this publication. The soil qualities that affect use and management are described in the section "Soil Series and Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Unique Farmland

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil qualities, location, growing season, and moisture supply needed for the economic production of sustained high yields of a specific high-quality crop when treated and managed by acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, and vegetables.

Unique farmland is used for a specific high-value food or fiber crop; has an adequate supply of available moisture for the specific crop because of stored moisture, precipitation, or irrigation; and has a combination of soil qualities, growing season, temperature, humidity, air drainage, elevation, aspect, and other factors, such as nearness to markets, that favors the production of a specific food or fiber crop.

Lists of unique farmland are developed as needed in cooperation with conservation districts and others.

Additional Farmland of Statewide Importance

Some areas other than areas of prime and unique farmland are of statewide importance in the production of food, feed, fiber, forage, and oilseed crops. The criteria used in defining and delineating these areas are determined by the appropriate State agency or agencies. Generally, additional farmland of statewide importance includes areas that nearly meet the criteria for prime farmland and that economically produce high yields of crops when treated and managed by acceptable farming methods. Some areas can produce as high a yield as areas of prime farmland if conditions are favorable. In some states additional farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

A list of this land has not been maintained for Montana and thus is not presently available.

Additional Farmland of Local Importance

This land consists of areas that are of local importance in the production of food, feed, fiber, forage, and oilseed crops and are not identified as having national or statewide importance. Where appropriate, this land is identified by local agencies. It may include tracts of land that have been designated for agriculture by local ordinance.

Lists of this land are developed as needed in cooperation with conservation districts and others.

Erosion Factors

Soil erodibility (K) and soil-loss tolerance (T) factors are used in an equation that predicts the amount of soil lost through water erosion in areas of cropland. The procedure for predicting soil loss is useful in guiding the selection of soil and water conservation practices.

Soil Erodibility (K) Factor

The soil erodibility factor (K) indicates the susceptibility of a soil to sheet and rill water erosion. The soil properties that influence erodibility are those that affect the infiltration rate, the movement of water through the soil, and the water storage capacity of the soil and those that allow the soil to resist dispersion, splashing, abrasion, and the transporting forces of rainfall and runoff. The most important soil properties are the content of silt plus very fine sand, the content of sand coarser than very fine sand, the content of organic matter, soil structure, and permeability.

Fragment-Free Soil Erodibility (Kf) Factor

This is one of the factors used in the revised Universal Soil Loss Equation. It shows the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Soil-Loss Tolerance (T) Factor

The soil-loss tolerance factor (T) is an estimate of the maximum annual rate of soil erosion that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons of soil loss per acre per year. Ratings of 1 to 5 are used, depending on soil properties and prior erosion. The criteria used in assigning a T factor to a soil include maintenance of an adequate rooting depth for crop production, potential reduction of crop yields, maintenance of water-control structures affected by sedimentation, prevention of gullying, and the value of nutrients lost through erosion.

Wind Erodibility Groups

Wind erodibility is directly related to the percentage of dry, nonerodible surface soil aggregates larger than 0.84 millimeter in diameter. From this percentage, the wind erodibility index factor (I) is determined. This factor is an expression of the stability of the soil aggregates, or the extent to which they are broken down by tillage and the abrasion caused by windblown soil particles. Soils are assigned to wind erodibility groups (WEG) having similar percentages of dry soil aggregates larger than 0.84 millimeter.

Additional information about wind erodibility groups and K, Kf, T, and I factors can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens and furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Windbreaks are often planted on land that did not originally support trees. Knowledge of how trees perform on such land can be gained only by observing and recording the performance of trees that have been planted and have survived. Many popular windbreak species are not indigenous to the areas in which they are planted.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters, a tree or shrub may grow well or grow poorly, depending on the characteristics of the soil. Each tree or shrub has definable potential heights in a given physiographic area and under a given climate. Accurate definitions of potential heights are necessary when a windbreak is planned and designed.

The "Windbreak Suitability Group Species" table shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in this table are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a nursery.

Windbreak Suitability Groups

Windbreak suitability groups consist of soils in which the kinds and degrees of the hazards and limitations that affect the survival and growth of trees and shrubs in windbreaks are about the same. The "Windbreak Suitability Groups" table shows the windbreak suitability group for each component of each map unit in the county.

Group 1 consists of soils that have no soil-related hazards or limitations or only slight hazards or limitations if they are used for windbreaks. Slopes are less than 15 percent.

Group 2M consists of soils that have a moderate available water capacity (5 to 10 inches) because of texture, depth, or both. The soils are well drained and are not affected by salinity. A layer of concentrated lime, if it occurs, is below a depth of 24 inches. Slopes are less than 15 percent.

Group 2L consists of soils that have a layer of concentrated lime (more than 15 percent calcium carbonate equivalent) at a depth of about 15 to 24 inches. The available water capacity is at least 5 inches. The soils are well drained and are not affected by salinity or alkalinity (the electrical conductivity is less than 4 millimhos per centimeter). Slopes are less than 15 percent.

Group 2W consists of soils that have an available water capacity of 5 inches or more. If the soils have a layer of concentrated lime, the layer is below a depth of 15 inches. The depth to a permanent water table is 30 to 60 inches. The soils are not affected by salinity. Slopes are less than 15 percent.

Group 2S consists of soils that are moderately affected by salinity (the electrical conductivity is 4 to 12 millimhos per centimeter). The available water capacity is at least 5 inches. A layer of concentrated lime, if it occurs, is at a depth of 15 inches or more. The water table is at a depth of 30 inches or more. Slopes are less than 15 percent.

Group 3M consists of soils that have an available water capacity of 2 to 5 inches because of texture, depth, or both. A layer of concentrated lime, if it occurs, is at a depth of 15 inches or more. The soils are well drained and are not affected by salinity (the electrical conductivity is less than 4 millimhos per centimeter).

Group 3L consists of soils that have a layer of concentrated lime (more than 15 percent calcium carbonate equivalent) at a depth of less than 15 inches. A permanent water table is at a depth of more than 30 inches. The available water capacity is more than 5 inches. The soils are not affected by salinity (the electrical conductivity is less than 4 millimhos per centimeter). Slopes are less than 15 percent.

Group 3W consists of soils that have an available water capacity of 2 inches or more. If the soils have a layer of concentrated lime, the layer is below a depth of 15 inches. The depth to a permanent water table is 30 inches or less. It is more than 10 inches during all or most of the growing season. The soils are not affected by salinity. Slopes are less than 15 percent.

Group 3S consists of soils that are severely affected by salinity or alkalinity (the electrical conductivity is 12 to 16 millimhos per centimeter). The available water capacity is 5 inches or more. A layer of concentrated lime, if it occurs, is at a depth of more than 15 inches. A permanent water table is at a depth of 30 inches or more. Slopes are less than 15 percent.

Group 4 consists of soils that have slopes of more than 15 percent, except for those in areas where the length of the slopes is 100 feet or less, and the less sloping soils that have very severe limitations, including soils that have a very low available water capacity (2 inches or less); very shallow, stony, or gravelly soils; strongly saline and alkali soils, in which the electrical conductivity is more than 16 millimhos per centimeter; and soils that have a pH of more than 9.0. Rock outcrop also is in this group.

Main Cropland Limitations and Hazards

(See text for a description of the limitations and hazards listed in this table.)

Soil name and map symbol	Cropland limitations or hazards
1E:	
Badland	Nonsoil material
2E:	
Rock outcrop	Nonsoil material
3A:	
Riverwash	Nonsoil material
5A:	
Harlake	Lime content Poor tilth Soil blowing
6A:	
Harlake	Flooding Lime content Poor tilth Soil blowing
7A:	
Lostriver	Lime content Poor tilth Salt content Sodium content Soil blowing Surface crusting
7B:	
Lostriver	Lime content Poor tilth Salt content Sodium content Soil blowing Surface crusting
Bullhook	Lime content Salt content Sodium content Soil blowing Surface crusting
8A:	
Harlake	Flooding Lime content Poor tilth Soil blowing
Havre	Flooding Soil blowing
8B:	
Harlake	Lime content Poor tilth Soil blowing
Havre	Soil blowing
9A:	
Havre	Soil blowing

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
9B:	
Havre	Flooding Soil blowing
Yamacall	None
10A:	
Havre	Flooding Soil blowing
11A:	
Havre	Soil blowing
Glendive	Lime content Soil blowing
11B:	
Havre	Flooding Soil blowing
Glendive	Flooding Lime content Soil blowing
12A:	
Havre	Channeled Flooding Soil blowing
Harlake	Channeled Flooding Lime content Poor tilth Soil blowing
13A:	
Havre	Lime content Soil blowing
14A:	
Havre	Lime content Soil blowing
Glendive	Lime content Soil blowing
14B:	
Havre	Flooding Lime content Soil blowing
Glendive	Flooding Lime content Soil blowing
15A:	
Havre	Lime content Soil blowing
Harlake	Lime content Poor tilth Soil blowing

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
16A:	
Havre	Flooding Lime content Soil blowing
Yamacall	Lime content Soil blowing
17A:	
Harlake	Lime content Poor tilth Soil blowing
Havre	Lime content Soil blowing
20B:	
Harlake	Flooding Lime content Poor tilth Soil blowing
Marvan	Lime content Poor tilth Restricted permeability Salt content Sodium content Soil blowing
Vanda	Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting
21A:	
McKenzie	Lime content Poor tilth Potential for ground-water pollution Restricted permeability Salt content Soil blowing Water table
22B:	
Nobe	Limited available water capacity Poor tilth Potential for ground-water pollution Restricted permeability Salt content Sodium content Surface crusting Water table
Absher	Lime content Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
23A:	
Gerdrum	Lime content Restricted permeability Salt content Sodium content Soil blowing Water erosion
Vanda	Limited available water capacity Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water erosion
23B:	
Gerdrum	Lime content Restricted permeability Salt content Sodium content Soil blowing Water erosion
Vanda	Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water erosion
Creed	Lime content Sodium content Soil blowing Water erosion
23C:	
Gerdrum	Lime content Restricted permeability Salt content Sodium content Soil blowing Water erosion
Creed	Lime content Sodium content Soil blowing Water erosion
25A:	
Vanda	Poor tilth Restricted permeability Salt content Sodium contet Soil blowing Surface crusting

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
26A:	
Weingart	Depth to rock Limited available water capacity Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water erosion
26B:	
Weingart	Depth to rock Limited available water capacity Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water erosion
Warhorse	Depth to rock Limited available water capacity Soil blowing Water erosion
30C:	
Busby	Excessive permeability Potential for ground-water pollution Soil blowing
30D:	
Busby	Excessive permeability Potential for ground-water pollution Slope Soil blowing Water erosion
31B:	
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
31C:	
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
31C:(cont.)	
Yamacall	Slope Water erosion
32B:	
Twilight	Depth to rock Limited available water capacity Soil blowing
32D:	
Twilight	Areas of rock outcrop Depth to rock Limited available water capacity Slope Soil blowing Water erosion
Blacksheep	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
33A:	
Yamacall	None
33B:	
Yamacall	Water erosion
34A:	
Yamacall	None
34B:	
Yamacall	Water erosion
35B:	
Yamacall	Water erosion
Busby	Excessive permeability Potential for ground-water pollution Soil blowing
36B:	
Yamacall	Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
37A:	
Yamacall	Lime content Soil blowing
37B:	
Yamacall	Lime content Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
38A:	
Kobase	Lime content Poor tilth Water erosion
Zatoville	Poor tilth Salt content Sodium content Soil blowing Water erosion
38B:	
Zatoville	Poor tilth Salt content Sodium content Soil blowing Water erosion
39B:	
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
39C:	
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Yamacall	Slope Water erosion
40B:	
Kobase	Lime content Poor tilth Water erosion
40C:	
Kobase	Lime content Poor tilth Soil blowing Surface crusting Water erosion
41A:	
Yamacall	Lime content Soil blowing
41B:	
Yamacall	Lime content Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
41C:	
Yamacall	Lime content Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
50B:	
Hinterland	Depth to rock Limited available water capacity Potential for ground-water pollution Soil blowing Water erosion
50C:	
Hinterland	Depth to rock Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
50D:	
Hinterland	Depth to rock Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Delplain	Depth to rock Limited available water capacity Poor tilth Potential for ground-water pollution Slope Soil blowing Water erosion
51A:	
Ethridge	None
51B:	
Ethridge	Water erosion
52A:	
Eapa	None
52B:	
Eapa	Water erosion
53A:	
Tanna	Depth to rock Limited available water capacity Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
54A:	
Marmarth	Depth to rock Lime content Limited available water capacity Soil blowing
56A:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing
Musselshell	Lime content Soil blowing
Attewan	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
57A:	
Attewan	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
57B:	
Attewan	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
57C:	
Attewan	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
Niart	Lime content Soil blowing
58A:	
Verson	Lime content Poor tilth Soil blowing
60B:	
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
60C:	
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Soil blowing Water erosion
Neldore	Depth to rock Limited available water capacity Poor tilth Soil blowing Water erosion
60D:	
Neldore	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing Water erosion
60E:	
Neldore	Soil blowing Water erosion Depth to rock Limited available water capacity Slope Areas of rock outcrop Poor tilth
Abor	Soil blowing Water erosion Depth to rock Restricted permeability Limited available water capacity Slope Areas of rock outcrop Lime content Poor tilth
61D:	
Neldore	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
61D: (cont.)	
Neldore, saline	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
61E:	
Neldore	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Volborg	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Surface crusting Water erosion
62C:	
Neldore	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
62D:	
Neldore	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
62E:	
Neldore	Areas of rock outcrop Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
63A:	
Marias	Lime content Poor tilth Restricted permeability Soil blowing
64A:	
Marvan	Lime content Poor tilth Restricted permeability Salt content Sodium content Soil blowing Water erosion
Vanda	Poor tilth Restricted permeability Salt content Sodium content Soil blowing Surface crusting Water erosion
64B:	
Marvan	Lime content Poor tilth Restricted permeability Salt content Sodium content Soil blowing Water erosion
67D:	
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
68C:	
Megonot	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
69C:	
Orinoco	Depth to rock Lime content Limited available water capacity Poor tilth Salt content Slope Sodium content Soil blowing Water erosion
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
73D:	
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing Water erosion
73E:	
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
74D:	
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing Water erosion
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
74E:	
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing Water erosion
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
80E:	
Blacksheep	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
Twilight	Areas of rock outcrop Depth to rock Limited available water capacity Slope Soil blowing Water erosion
81B:	
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
81B: (cont.)	
Cabbart	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
81C:	
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
81D:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
82B:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
82C:	
Cabbart	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Delpoint	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
82C: (cont.)	
Rock outcrop	Nonsoil material
82E:	
Cabbart	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Delpoint	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
83D:	
Cabbart	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
Blacksheep	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
84C:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
84D:	
Cabbart	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Yawdim	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
84E:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
85A:	
Cabbart	Depth to rock Lime content Limited available water capacity Soil blowing
86D:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rentsac	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
86E:	
Cabbart	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
87B:	
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
Cabbart	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
88D:	
Delpoint	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Cabbart	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
89C:	
Rentsac	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Soil blowing
90B:	
Chinook	Soil blowing
91A:	
Kremlin	None
91B:	
Kremlin	Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
92A:	
Binna	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing
93A:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing
Musselshell	Lime content Soil blowing
93B:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
94A:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing
94E:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
95A:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
Musselshell	Lime content Soil blowing Surface rock fragments
95B:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
95B: (cont.)	
Attewan	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
Musselshell	Lime content Soil blowing Surface rock fragments
95C:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
Attewan	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
95E:	
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
96E:	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Abor	Depth to rock Lime content Limited available water capacity Poor tilth Restricted permeability Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
97A:	
Musselshell	Lime content Soil blowing Surface rock fragments
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing Surface rock fragments
97B:	
Musselshell	Lime content Soil blowing Water erosion
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing
98A:	
Niart	Lime content Soil blowing Surface rock fragments
98B:	
Niart	Lime content Soil blowing
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Soil blowing
98C:	
Niart	Lime content Slope Soil blowing Water erosion
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
98D:	
Niart	Lime content Soil blowing
Rothiemay	Lime content Soil blowing

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
123C:	
Creed	Lime content Sodium content Soil blowing Water erosion
Gerdrum	Lime content Restricted permeability Salt content Sodium content Soil blowing Water erosion
130B:	
Busby	Soil blowing
Twilight	Soil blowing Depth to rock Limited available water capacity
131C:	
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
Yamacall	Water erosion
132B:	
Twilight	Depth to rock Limited available water capacity Soil blowing
Blacksheep	Depth to rock Lime content Limited available water capacity Soil blowing
138B:	
Zatoville	Poor tilth Salt content Sodium content Soil blowing Water erosion
Orinoco	Depth to rock Lime content Limited available water capacity Poor tilth Salt content Sodium content Soil blowing Water erosion
140B:	
Kobase	Lime content Poor tilth Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
140B: (cont.)	
Megonot	Depth to rock Lime content Limited available water capacity Poor tilth Soil blowing Water erosion
140C:	
Kobase	Lime content Poor tilth Soil blowing Surface crusting Water erosion
Megonot	Depth to rock Lime content Limited available water capacity Poor tilth Soil blowing Water erosion
142A:	
Rothiemay	Lime content Soil blowing
142B:	
Rothiemay	Lime content Soil blowing Water erosion
142C:	
Rothiemay	Lime content Slope Soil blowing Water erosion
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
152A:	
Eapa	None
Attewan	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
153C:	
Tanna	Depth to rock Limited available water capacity Soil blowing Water erosion
Cabbart	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
153D:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Tanna	Depth to rock Limited available water capacity Slope Soil blowing Water erosion
154C:	
Marmarth	Depth to rock Lime content Limited available water capacity Soil blowing
Cabbart	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
154D:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Marmarth	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
158A:	
Ethridge	None
Verson	Lime content Poor tilth Soil blowing
167D:	
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
167D: (cont.)	
Orinoco	Depth to rock Lime content Limited available water capacity Poor tilth Salt content Slope Sodium content Soil blowing Water erosion
167E:	
Yawdim	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Orinoco	Depth to rock Lime content Limited available water capacity Poor tilth Salt content Slope Sodium content Soil blowing Water erosion
181D:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
181E:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
181E: (cont.)	
Crago	Excessive permeability Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
189C:	
Rentsac	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
189E:	
Rentsac	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
230C:	
Macar	Water erosion
232E:	
Hughesville	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Surface rock fragments Water erosion
Tibs	Lime content Limited available water capacity Poor tilth Slope Soil blowing Surface rock fragments

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
232E: (cont.)	
Whitecow	Lime content Limited available water capacity Slope Soil blowing Surface rock fragments Water erosion
234F:	
Tibs	Lime content Limited available water capacity Poor tilth Slope Soil blowing Surface rock fragments Water erosion
Whitecow	Lime content Limited available water capacity Slope Soil blowing Surface rock fragments Water erosion
240E:	
Ridge	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Dast	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
241E:	
Twilight	Areas of rock outcrop Depth to rock Limited available water capacity Slope Soil blowing Water erosion
Blacksheep	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
242D:	
Dast	Depth to rock Lime content Limited available water capacity Soil blowing
Ridge	Depth to rock Lime content Limited available water capacity Soil blowing
242F:	
Ridge	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Dast	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
243F:	
Blacksheep	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Twilight	Depth to rock Limited available water capacity Slope Soil blowing Water erosion
245C:	
Lamedeer	Soil blowing
Ringling	Excessive permeability Limited available water capacity Potential for ground-water pollution Soil blowing
245F:	
Lamedeer	Slope Soil blowing Water erosion
Ringling	Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
246F:	
Lamedeer	Slope Soil blowing Water erosion
Ringling	Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
250E:	
Macmeal	Areas of rock outcrop Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
251C:	
Savage	Water erosion
252D:	
Hilger	Areas of rock outcrop Limited available water capacity Slope Surface stones Water erosion
Rock outcrop	Nonsoil material
252E:	
Hilger	Limited available water capacity Slope Surface stones Water erosion
254C:	
Fergus	Water erosion
255C:	
Shambo	None
Korchea	Lime content
Barvon	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
255D:	
Barvon	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
255D: (cont.)	
Cabba	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Shambo	Water erosion
256C:	
Yamacall	Water erosion
Havre	Soil blowing
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
260F:	
Kuro	Areas of rock outcrop Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Wayden	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
261F:	
Wayden	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Castner	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
262E:	
Wayden	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
Windham	Lime content Limited available water capacity Soil blowing
280D:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
280E:	
Castner	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Kuro	Depth to rock Limited available water capacity Poor tilth Slope Soil blowing Water erosion
281D:	
Doney	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Cabba	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Macar	Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
281E:	
Castner	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
282D:	
Castner	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion
283D:	
Barvon	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
Cabba	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
283F:	
Cabba	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
284D:	
Cabba	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Barvon	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
284F:	
Doney	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Wayden	Depth to rock Lime content Limited available water capacity Poor tilth Slope Soil blowing Water erosion
285D:	
Cabba	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Doney	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
285F:	
Cabba	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Doney	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
286F:	
Cabbart	Areas of rock outcrop Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Rock outcrop	Nonsoil material
287D:	
Delpoint	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
287D: (cont.)	
Cabbart	Depth to rock Lime content Limited available water capacity Soil blowing Water erosion
287F:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
288D:	
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Havre	Soil blowing Water erosion
288F:	
Cabbart	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Delpoint	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
289D:	
Barvon	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
289D: (cont.)	
Cabba	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Korchea	Lime content
289F:	
Cabba	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
Barvon	Depth to rock Lime content Limited available water capacity Slope Soil blowing Water erosion
291C:	
Windham	Lime content Limited available water capacity Slope Soil blowing Surface stones Water erosion
292A:	
Straw	Soil blowing
Korchea	Lime content
294C:	
Shambo	Water erosion
295F:	
Bitton	Slope Soil blowing Water erosion
Winifred	Depth to rock Poor tilth Slope Soil blowing Water erosion
Castner	Depth to rock Lime content Limited available water capacity Potential for ground-water pollution Slope Soil blowing Water erosion

Main Cropland Limitations and Hazards--Continued

Soil name and map symbol	Cropland limitations or hazards
296D:	
Borky	Depth to rock Limited available water capacity Slope Surface stones Water erosion
Sinnigam	Depth to rock Limited available water capacity Potential for ground-water pollution Slope Surface stones
DA:	
Denied access	Onsite required
UL:	
Urban land	Nonsoil material
W:	
Water	Nonsoil material

Land Capability and Yields per Acre of Crops

(Yields in the 'N' columns are for nonirrigated soils; those in the 'I' column are for irrigated soils. Yields are those that can be expected under a high level of nonirrigated and irrigated management by component name. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil.)

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
1E:												
Badland			---	---	---	---	---	---	---	---	---	---
2E:												
Rock outcrop			---	---	---	---	---	---	---	---	---	---
3A:												
Riverwash			---	---	---	---	---	---	---	---	---	---
5A:												
Harlake	4E	4E	29	---	25	---	40	---	---	---	---	---
6A:												
Harlake	4W	4W	29	---	25	---	40	---	---	---	---	---
7A:												
Lostriver	6S		---	---	---	---	---	---	---	---	---	---
7B:												
Lostriver	6S		---	---	---	---	---	---	---	---	---	---
Bullhook	6S		---	---	---	---	---	---	---	---	---	---
8A:												
Harlake	4W	4W	29	---	25	---	40	---	---	---	---	---
Havre	3W	2W	29	---	25	---	40	---	1.5	7.0	1.5	3.0
8B:												
Harlake	4E	4E	29	---	25	---	40	---	---	---	---	---
Havre	3E	2E	29	---	25	---	40	---	1.8	7.0	1.5	3.0
9A:												
Havre	3E	2E	38	---	34	---	55	---	1.8	7.0	1.5	3.0
9B:												
Havre	3W	2W	38	---	34	---	55	---	1.5	7.0	1.5	3.0
Yamacall	3E	2E	38	---	34	---	55	---	1.2	4.8	1.2	3.0
10A:												
Havre	3W	2W	38	---	34	---	55	---	1.5	7.0	1.5	3.0
11A:												
Havre	3E	2E	38	---	34	---	55	---	1.8	7.0	1.5	3.0
Glendive	4E	4E	38	---	34	---	55	---	1.5	5.0	---	---
11B:												
Havre	3W	2W	38	---	34	---	55	---	1.5	7.0	1.5	3.0
Glendive	4W	4W	39	---	34	---	56	---	1.4	4.0	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
12A:												
Havre-----------	6W		38	---	34	---	55	---	---	---	---	---
Harlake---------	6W		29	---	26	---	43	---	---	---	---	---
13A:												
Havre-----------	4E	4E	36	---	31	---	52	---	1.8	7.0	1.5	3.0
14A:												
Havre-----------	4E	4E	36	---	31	---	52	---	1.8	7.0	1.5	3.0
Glendive--------	4E	4E	38	---	34	---	55	---	1.5	5.0	---	---
14B:												
Havre-----------	4E	4E	36	---	31	---	52	---	1.8	7.0	1.5	3.0
Glendive--------	4W	4W	39	---	34	---	56	---	1.4	4.0	---	---
15A:												
Havre-----------	4E	4E	29	---	25	---	40	---	1.8	7.0	1.5	3.0
Harlake---------	4E	4E	32	---	24	---	36	---	1.5	6.0	1.3	3.0
16A:												
Havre-----------	4E	4E	36	---	31	---	52	---	1.8	7.0	1.5	3.0
Yamacall--------	4E	4E	38	---	33	---	55	---	1.5	5.5	---	---
17A:												
Harlake---------	4E	4E	32	---	24	---	36	---	1.5	6.0	1.3	3.0
Havre-----------	4E	4E	29	---	25	---	40	---	1.8	7.0	1.5	3.0
20B:												
Harlake---------	4W	4W	29	---	25	---	40	---	---	---	---	---
Marvan----------	4E	4E	13	---	11	---	20	---	0.5	---	0.5	---
Vanda-----------	7S		---	---	---	---	---	---	---	---	---	---
21A:												
McKenzie--------	5W		---	---	---	---	---	---	---	---	---	---
22B:												
Nobe------------	7S		---	---	---	---	---	---	---	---	---	---
Absher----------	7S	7S	---	---	---	---	---	---	---	---	---	---
23A:												
Gerdrum---------	6E	6E	19	---	17	---	30	---	---	---	---	---
Vanda-----------	7S		---	---	---	---	---	---	---	---	---	---
23B:												
Gerdrum---------	6E	6E	19	---	17	---	30	---	---	---	---	---
Vanda-----------	7S		---	---	---	---	---	---	---	---	---	---
Creed-----------	4E	4E	19	---	17	---	31	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
23C:												
Gerdrum----------	6E	6E	19	---	17	---	30	---	---	---	---	---
Creed------------	4E	4E	19	---	17	---	31	---	---	---	---	---
25A:												
Vanda------------	7S		---	---	---	---	---	---	---	---	---	---
26A:												
Weingart---------	6E		---	---	---	---	---	---	---	---	---	---
26B:												
Weingart---------	6E		---	---	---	---	---	---	---	---	---	---
Warhorse---------	6E		---	---	---	---	---	---	---	---	---	---
30C:												
Busby------------	4E	4E	27	---	22	---	38	---	---	---	---	---
30D:												
Busby------------	4E	4E	25	---	20	---	33	---	---	---	---	---
31B:												
Delpoint---------	3E	3E	28	---	22	---	35	---	0.8	---	1.0	---
31C:												
Delpoint---------	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
Cabbart----------	6E		---	---	---	---	---	---	---	---	---	---
Yamacall---------	4E	4E	25	---	22	---	35	---	0.8	---	0.8	---
32B:												
Twilight---------	4E	4E	29	---	26	---	43	---	1.0	---	---	---
32D:												
Twilight---------	4E		17	---	15	---	22	---	0.8	---	---	---
Blacksheep-------	6E		---	---	---	---	---	---	---	---	---	---
Rock outcrop-----			---	---	---	---	---	---	---	---	---	---
33A:												
Yamacall---------	3E	2E	38	---	34	---	55	---	1.2	5.0	1.2	3.0
33B:												
Yamacall---------	3E	3E	38	---	34	---	55	---	1.0	---	1.0	---
34A:												
Yamacall---------	3E	2E	38	---	33	---	55	---	1.2	5.0	1.2	3.0
34B:												
Yamacall---------	3E	3E	38	---	33	---	55	---	1.0	---	1.0	---
35B:												
Yamacall---------	3E	3E	29	---	25	---	38	---	1.0	---	1.0	---
Busby------------	4E	4E	27	---	22	---	38	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
36B:												
Yamacall--------	3E	3E	29	---	25	---	38	---	1.0	---	1.0	---
Delpoint--------	3E	3E	28	---	22	---	35	---	0.8	---	1.0	---
37A:												
Yamacall--------	4E	4E	36	---	31	---	52	---	1.5	5.5	---	---
37B:												
Yamacall--------	4E	4E	36	---	31	---	52	---	1.3	4.5	---	---
38A:												
Kobase----------	3E	3E	25	---	22	---	35	---	0.8	---	1.0	---
Zatoville-------	6E		---	---	---	---	---	---	---	---	---	---
38B:												
Zatoville-------	6E		32	---	28	---	47	---	---	---	---	---
39B:												
Delpoint--------	4E	4E	28	---	22	---	35	---	0.8	---	---	---
39C:												
Delpoint--------	4E		22	---	18	---	30	---	---	---	---	---
Cabbart---------	6E		---	---	---	---	---	---	---	---	---	---
Yamacall--------	4E	4E	25	---	22	---	35	---	0.8	---	0.8	---
40B:												
Kobase----------	3E	3E	38	---	34	---	55	---	0.8	---	1.0	---
40C:												
Kobase----------	4E	4E	28	---	24	---	32	---	0.8	---	1.0	---
41A:												
Yamacall--------	4E	4E	38	---	33	---	55	---	1.5	5.5	---	---
41B:												
Yamacall--------	4E	4E	38	---	33	---	55	---	1.3	4.5	---	---
41C:												
Yamacall--------	4E	4E	38	---	33	---	55	---	1.3	4.5	---	---
Delpoint--------	4E	4E	20	---	18	---	32	---	0.8	---	---	---
50B:												
Hinterland------	6S		---	---	---	---	---	---	0.6	---	0.6	---
50C:												
Hinterland------	6E		---	---	---	---	---	---	---	---	---	---
50D:												
Hinterland------	6E		---	---	---	---	---	---	---	---	---	---
Delplain--------	7E		---	---	---	---	---	---	---	---	---	---
51A:												
Ethridge--------	3E	3E	39	---	34	---	56	---	1.5	5.5	1.2	3.0

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
51B:												
Ethridge--------	3E	3E	39	---	34	---	56	---	1.5	---	1.0	---
52A:												
Eapa------------	3C		32	---	23	---	---	---	1.5	---	---	---
52B:												
Eapa------------	3E		28	---	22	---	---	---	1.4	---	---	---
53A:												
Tanna-----------	3E	3E	22	---	20	---	34	---	1.0	---	1.2	---
54A:												
Marmarth--------	4E		30	---	26	---	44	---	---	---	---	---
56A:												
Crago-----------	6S	4E	---	---	---	---	---	---	---	---	---	---
Musselshell-----	4E	4E	25	---	20	---	35	---	---	5.0	---	---
Attewan---------	3E	3E	21	---	18	---	30	---	1.3	4.0	---	---
57A:												
Attewan---------	3E	3E	29	---	26	---	45	---	1.3	4.0	---	---
57B:												
Attewan---------	4E	4E	26	---	23	---	39	---	---	5.0	---	---
57C:												
Attewan---------	3E	3E	21	---	18	---	30	---	1.3	4.0	---	---
Niart-----------	4E	4E	25	---	22	---	35	---	1.2	5.0	---	---
58A:												
Verson----------	3E	3E	27	---	24	---	41	---	1.0	---	1.2	---
60B:												
Abor------------	4E		29	---	26	---	43	---	0.8	---	1.0	---
60C:												
Abor------------	4E		29	---	26	---	43	---	0.8	---	1.0	---
Neldore---------	6S		14	---	13	---	24	---	---	---	---	---
60D:												
Neldore---------	6E		9	---	8	---	17	---	---	---	---	---
Abor------------	4E		24	---	21	---	36	---	0.6	---	0.8	---
60E:												
Neldore---------	7E		---	---	---	---	---	---	---	---	---	---
Abor------------	6E		---	---	---	---	---	---	---	---	---	---
61D:												
Neldore---------	6E		---	---	---	---	---	---	---	---	---	---
Neldore, saline-	7S		---	---	---	---	---	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
61E:												
Neldore	6E		---	---	---	---	---	---	---	---	---	---
Volborg	7S		---	---	---	---	---	---	---	---	---	---
62C:												
Neldore	6E		3	---	3	---	1	---	---	---	---	---
62D:												
Neldore	6E		---	---	---	---	---	---	---	---	---	---
Yawdim	6E		---	---	---	---	---	---	---	---	---	---
62E:												
Neldore	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
63A:												
Marias	4E		34	---	30	---	50	---	1.0	---	---	---
64A:												
Marvan	4E	4E	63	---	55	---	87	---	0.5	---	0.5	---
Vanda	7S		---	---	---	---	---	---	---	---	---	---
64B:												
Marvan	4E	4E	33	---	29	---	48	---	0.5	---	0.5	---
67D:												
Yawdim	6E		---	---	---	---	---	---	---	---	---	---
68C:												
Megonot	4E		30	---	25	---	40	---	---	---	---	---
Yawdim	6E		---	---	---	---	---	---	---	---	---	---
69C:												
Orinoco	6E		12	---	11	---	21	---	---	---	---	---
Yawdim	6E		---	---	---	---	---	---	---	---	---	---
73D:												
Yawdim	6E		---	---	---	---	---	---	---	---	---	---
Abor	4E		24	---	21	---	36	---	0.6	---	0.8	---
73E:												
Yawdim	7E		---	---	---	---	---	---	---	---	---	---
Abor	6E		---	---	---	---	---	---	---	---	---	---
74D:												
Abor	4E		26	---	23	---	39	---	0.6	---	0.8	---
Crago	6E	4E	5	---	5	---	13	---	---	---	---	---
74E:												
Abor	6E		---	---	---	---	---	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
80E:												
Blacksheep	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
Twilight	4E		17	---	15	---	22	---	0.8	---	---	---
81B:												
Delpoint	3E	3E	28	---	22	---	35	---	0.8	---	1.0	---
Cabbart	6S		---	---	---	---	---	---	---	---	---	---
81C:												
Delpoint	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
Cabbart	6E		---	---	---	---	---	---	---	---	---	---
81D:												
Cabbart	6E		13	---	12	---	22	---	---	---	---	---
82B:												
Cabbart	6E		---	---	---	---	---	---	---	---	---	---
Delpoint	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
82C:												
Cabbart	6E		---	---	---	---	---	---	---	---	---	---
Delpoint	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
82E:												
Cabbart	7E		---	---	---	---	---	---	---	---	---	---
Delpoint	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
83D:												
Cabbart	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
Blacksheep	7E		---	---	---	---	---	---	---	---	---	---
84C:												
Cabbart	6E		---	---	---	---	---	---	---	---	---	---
Yawdim	6E		---	---	---	---	---	---	---	---	---	---
Delpoint	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
84D:												
Cabbart	7E		---	---	---	---	---	---	---	---	---	---
Yawdim	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
84E:												
Cabbart----------	7E		---	---	---	---	---	---	---	---	---	---
Yawdim----------	7E		---	---	---	---	---	---	---	---	---	---
Delpoint---------	6E		---	---	---	---	---	---	---	---	---	---
85A:												
Cabbart----------	6E		15	---	14	---	25	---	---	---	---	---
86D:												
Cabbart----------	6E		13	---	12	---	22	---	---	---	---	---
Rentsac----------	7S		7	---	7	---	15	---	---	---	---	---
86E:												
Cabbart----------	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop----			---	---	---	---	---	---	---	---	---	---
87B:												
Delpoint---------	4E	4E	28	---	22	---	35	---	0.8	---	---	---
Cabbart----------	6S		---	---	---	---	---	---	---	---	---	---
88D:												
Delpoint---------	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
Cabbart----------	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop----			---	---	---	---	---	---	---	---	---	---
89C:												
Rentsac----------	7S		---	---	---	---	---	---	---	---	---	---
90B:												
Chinook----------	4E	4E	32	---	29	---	48	---	0.8	3.5	1.0	3.0
91A:												
Kremlin----------	3E	3E	32	---	27	---	42	---	1.0	---	---	---
91B:												
Kremlin----------	3E	3E	30	---	25	---	40	---	1.0	---	---	---
92A:												
Binna------------	3E	2E	28	---	24	---	41	---	1.5	4.5	---	---
93A:												
Crago------------	6S	4E	---	---	---	---	---	---	---	---	---	---
Musselshell------	4E	4E	23	---	20	---	32	---	---	4.5	---	---
93B:												
Crago------------	6S	6S	11	---	10	---	20	---	---	---	---	---
94A:												
Crago------------	6S	4E	9	---	8	---	16	---	---	---	---	---
94E:												
Crago------------	6E		---	---	---	---	---	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
95A:												
Crago	6S	6S	---	---	---	---	---	---	---	---	---	---
Musselshell	4E	4E	23	---	20	---	32	---	---	4.5	---	---
95B:												
Crago	6S	6S	---	---	---	---	---	---	---	---	---	---
Attewan	4E	4E	15	---	14	---	24	---	---	5.0	---	---
Musselshell	4E	4E	23	---	20	---	32	---	---	4.5	---	---
95C:												
Crago	6S	6S	11	---	10	---	20	---	---	---	---	---
Attewan	4E	4E	26	---	23	---	39	---	---	5.0	---	---
95E:												
Yawdim	7E		---	---	---	---	---	---	---	---	---	---
Crago	6E		---	---	---	---	---	---	---	---	---	---
96E:												
Crago	6E		---	---	---	---	---	---	---	---	---	---
Abor	6E		---	---	---	---	---	---	---	---	---	---
97A:												
Musselshell	4E	4E	23	---	20	---	32	---	---	4.5	---	---
Crago	6S	6S	---	---	---	---	---	---	---	---	---	---
97B:												
Musselshell	4E	4E	20	---	17	---	30	---	---	---	---	---
Crago	6S	4E	---	---	---	---	---	---	---	---	---	---
98A:												
Niart	4E	4E	25	---	22	---	35	---	1.2	5.0	---	---
98B:												
Niart	4E	4E	25	---	22	---	35	---	1.2	5.0	---	---
Crago	6S	4E	---	---	---	---	---	---	---	---	---	---
98C:												
Niart	4E	4E	---	---	---	---	---	---	---	---	---	---
Crago	6E	4E	---	---	---	---	---	---	---	---	---	---
98D:												
Niart	4E	4E	25	---	22	---	35	---	1.2	5.0	---	---
Rothiemay	3E	2E	33	---	27	---	40	---	1.0	5.0	---	---
123C:												
Creed	4E	4E	19	---	17	---	31	---	---	---	---	---
Gerdrum	6E	6E	19	---	17	---	30	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
130B:												
Busby	4E		27	---	22	---	38	---	---	---	---	---
Twilight	4E		20	---	17	---	25	---	---	---	---	---
131C:												
Delpoint	3E	3E	28	---	22	---	35	---	0.8	---	1.0	---
Yamacall	3E	3E	29	---	25	---	38	---	1.0	---	1.0	---
132B:												
Twilight	4E	4E	20	---	17	---	25	---	1.0	---	---	---
Blacksheep	6E		---	---	---	---	---	---	---	---	---	---
138B:												
Zatoville	6E		32	---	28	---	47	---	---	---	---	---
Orinoco	6E		17	---	16	---	28	---	---	---	---	---
140B:												
Kobase	3E	3E	25	---	22	---	35	---	0.8	---	1.0	---
Megonot	4E	4E	35	---	30	---	45	---	---	---	---	---
140C:												
Kobase	4E	4E	28	---	24	---	32	---	0.8	---	1.0	---
Megonot	4E	4E	35	---	30	---	45	---	---	---	---	---
142A:												
Rothiemay	4E	4E	37	---	33	---	55	---	1.5	5.0	---	---
142B:												
Rothiemay	4E	4E	37	---	33	---	55	---	1.0	4.5	---	---
142C:												
Rothiemay	4E	4E	28	---	22	---	35	---	0.8	4.6	---	---
Crago	6E	4E	---	---	---	---	---	---	---	---	---	---
152A:												
Eapa	3C		32	---	23	---	---	---	1.5	---	---	---
Attewan	3E	3E	21	---	18	---	30	---	1.3	4.0	---	---
153C:												
Tanna	3E	3E	22	---	20	---	34	---	0.8	---	1.0	---
Cabbart	6S		16	---	14	---	26	---	---	---	---	---
153D:												
Cabbart	6E		13	---	12	---	22	---	---	---	---	---
Tanna	4E	4E	17	---	15	---	27	---	0.6	---	0.8	---
154C:												
Marmarth	3E		31	---	27	---	46	---	---	---	---	---
Cabbart	6S		16	---	14	---	26	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
154D:												
Cabbart----------	6E		13	---	12	---	22	---	---	---	---	---
Marmarth---------	4E		27	---	24	---	41	---	---	---	---	---
158A:												
Ethridge---------	3E	3E	39	---	34	---	56	---	1.5	5.5	1.2	3.0
Verson-----------	3E	3E	27	---	24	---	41	---	1.0	---	1.2	---
167D:												
Yawdim-----------	6E		---	---	---	---	---	---	---	---	---	---
Orinoco----------	6E		12	---	11	---	21	---	---	---	---	---
167E:												
Yawdim-----------	7E		---	---	---	---	---	---	---	---	---	---
Orinoco----------	6E		---	---	---	---	---	---	---	---	---	---
181D:												
Cabbart----------	6E		---	---	---	---	---	---	---	---	---	---
Crago------------	6E	4E	---	---	---	---	---	---	---	---	---	---
Delpoint---------	4E	4E	22	---	18	---	30	---	0.6	---	0.8	---
181E:												
Cabbart----------	7E		---	---	---	---	---	---	---	---	---	---
Crago------------	6E		---	---	---	---	---	---	---	---	---	---
Delpoint---------	6E		---	---	---	---	---	---	---	---	---	---
189C:												
Rentsac----------	7S		---	---	---	---	---	---	---	---	---	---
Cabbart----------	6E		---	---	---	---	---	---	---	---	---	---
189E:												
Rentsac----------	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop-----			---	---	---	---	---	---	---	---	---	---
230C:												
Macar------------	3E		28	---	24	---	35	---	1.4	---	0.8	---
232E:												
Hughesville------	6E		---	---	---	---	---	---	---	---	---	---
Tibs-------------	4E		17	---	15	---	25	---	---	---	---	---
Whitecow---------	4E		13	---	11	---	20	---	---	---	---	---
234F:												
Tibs-------------	7E		---	---	---	---	---	---	---	---	---	---
Whitecow---------	7E		---	---	---	---	---	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
240E:												
Ridge-----------	6E		---	---	---	---	---	---	---	---	---	---
Dast------------	6E		---	---	---	---	---	---	---	---	---	---
Rock outcrop----			---	---	---	---	---	---	---	---	---	---
241E:												
Twilight--------	4E		17	---	15	---	22	---	0.8	---	---	---
Blacksheep------	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop----			---	---	---	---	---	---	---	---	---	---
242D:												
Dast------------	4E	4E	20	---	15	---	22	---	0.6	---	0.8	---
Ridge-----------	6S		---	---	---	---	---	---	---	---	---	---
242F:												
Ridge-----------	7E		---	---	---	---	---	---	---	---	---	---
Dast------------	6E		---	---	---	---	---	---	---	---	---	---
243F:												
Blacksheep------	7E		---	---	---	---	---	---	---	---	---	---
Twilight--------	6E		---	---	---	---	---	---	---	---	---	---
245C:												
Lamedeer--------	4E		29	---	25	---	37	---	---	---	1.0	---
Ringling--------	7S		---	---	---	---	---	---	---	---	---	---
245F:												
Lamedeer--------	6E		---	---	---	---	---	---	---	---	---	---
Ringling--------	7E		---	---	---	---	---	---	---	---	---	---
246F:												
Lamedeer--------	6E		---	---	---	---	---	---	---	---	---	---
Ringling--------	7E		---	---	---	---	---	---	---	---	---	---
250E:												
Macmeal---------	6E		---	---	---	---	---	---	---	---	---	---
Rock outcrop----			---	---	---	---	---	---	---	---	---	---
251C:												
Savage----------	3E	3E	41	---	36	---	58	---	1.2	4.0	---	---
252D:												
Hilger----------	6E		12	---	11	---	24	---	---	---	---	---
Rock outcrop----			---	---	---	---	---	---	---	---	---	---
252E:												
Hilger----------	6S		---	---	---	---	---	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
254C:												
Fergus----------	3E	3E	35	---	31	---	49	---	1.5	---	1.5	---
255C:												
Shambo----------	3E	2E	35	---	35	---	45	---	2.2	---	---	---
Korchea---------	3E	3E	40	---	32	---	50	---	1.8	5.0	1.8	3.0
Barvon----------	4E		---	---	---	---	---	---	---	---	---	---
255D:												
Barvon----------	4E		---	---	---	---	---	---	---	---	---	---
Cabba-----------	6E		---	---	---	---	---	---	---	---	---	---
Shambo----------	3E	3E	30	---	35	---	45	---	2.2	---	---	---
256C:												
Yamacall--------	3E	3E	29	---	25	---	38	---	1.0	---	1.0	---
Havre-----------	3E	2E	29	---	25	---	40	---	1.8	7.0	1.5	3.0
Delpoint--------	3E		---	---	---	---	---	---	---	---	---	---
260F:												
Kuro------------	6E		---	---	---	---	---	---	---	---	---	---
Wayden----------	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop----			---	---	---	---	---	---	---	---	---	---
261F:												
Wayden----------	7E		---	---	---	---	---	---	---	---	---	---
Castner---------	7E		---	---	---	---	---	---	---	---	---	---
262E:												
Wayden----------	6E		15	---	14	---	27	---	---	---	---	---
Windham---------	6S	4S	22	---	20	---	36	---	0.5	---	0.5	---
280D:												
Cabbart---------	6E		---	---	---	---	---	---	---	---	---	---
Delpoint--------	3E		---	---	---	---	---	---	---	---	---	---
280E:												
Castner---------	7S		14	---	12	---	24	---	---	---	---	---
Kuro------------	6E		---	---	---	---	---	---	---	---	---	---
281D:												
Doney-----------	4E		22	---	18	---	22	---	0.6	---	0.8	---
Cabba-----------	6E		---	---	---	---	---	---	---	---	---	---
Macar-----------	3E		28	---	24	---	35	---	1.4	---	0.8	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
281E:												
Castner	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
282D:												
Castner	7S		14	---	12	---	24	---	---	---	---	---
283D:												
Barvon	4E		---	---	---	---	---	---	---	---	---	---
Cabba	6S		---	---	---	---	---	---	---	---	---	---
283F:												
Cabba	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
284D:												
Cabba	6E		---	---	---	---	---	---	---	---	---	---
Barvon	4E		---	---	---	---	---	---	---	---	---	---
284F:												
Doney	7E		---	---	---	---	---	---	---	---	---	---
Wayden	7E		---	---	---	---	---	---	---	---	---	---
285D:												
Cabba	6E		---	---	---	---	---	---	---	---	---	---
Doney	3E		28	---	22	---	35	---	0.8	---	1.0	---
285F:												
Cabba	7E		---	---	---	---	---	---	---	---	---	---
Doney	6E		---	---	---	---	---	---	---	---	---	---
286F:												
Cabbart	7E		---	---	---	---	---	---	---	---	---	---
Rock outcrop			---	---	---	---	---	---	---	---	---	---
287D:												
Delpoint	3E		---	---	---	---	---	---	---	---	---	---
Cabbart	6S		---	---	---	---	---	---	---	---	---	---
287F:												
Cabbart	7E		---	---	---	---	---	---	---	---	---	---
Delpoint	6E		---	---	---	---	---	---	---	---	---	---
288D:												
Delpoint	4E		---	---	---	---	---	---	---	---	---	---
Cabbart	7E		---	---	---	---	---	---	---	---	---	---
Havre	3E	3E	29	---	29	---	40	---	---	---	---	---

Land Capability and Yields per Acre of Crops--Continued

Map symbol and soil name	Land capability		Wheat, winter		Wheat, spring		Barley		Alfalfa hay		Grass hay	
	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Bu		Tons		Tons	
288F:												
Cabbart	7E		---	---	---	---	---	---	---	---	---	---
Delpoint	6E		---	---	---	---	---	---	---	---	---	---
289D:												
Barvon	4E		---	---	---	---	---	---	---	---	---	---
Cabba	7E		---	---	---	---	---	---	---	---	---	---
Korchea	3E	3E	40	---	32	---	50	---	1.8	5.0	1.8	3.0
289F:												
Cabba	7E		---	---	---	---	---	---	---	---	---	---
Barvon	6E		---	---	---	---	---	---	---	---	---	---
291C:												
Windham	7S		---	---	---	---	---	---	---	---	---	---
292A:												
Straw	3E	2E	40	---	32	---	50	---	2.0	5.5	---	---
Korchea	3E	3E	40	---	32	---	50	---	1.8	5.0	1.8	3.0
294C:												
Shambo	3E	3E	30	---	35	---	45	---	2.2	---	---	---
295F:												
Bitton	7E		---	---	---	---	---	---	---	---	---	---
Winifred	6E		---	---	---	---	---	---	---	---	---	---
Castner	7E		---	---	---	---	---	---	---	---	---	---
296D:												
Borky	7S		---	---	---	---	---	---	---	---	---	---
Sinnigam	7S		---	---	---	---	---	---	---	---	---	---
DA:												
Denied access			---	---	---	---	---	---	---	---	---	---
UL:												
Urban land			---	---	---	---	---	---	---	---	---	---
W:												
Water			---	---	---	---	---	---	---	---	---	---

Prime Farmland

The following map units meet the requirements for prime farmland if irrigated.

Map symbol	Soil name
5A	Harlake silty clay, 0 to 2 percent slopes
6A	Harlake silty clay, 0 to 2 percent slopes, occasionally flooded
8A	Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded
8B	Harlake-Havre complex, 0 to 2 percent slopes
9A	Havre loam, 0 to 2 percent slopes
10A	Havre loam, 0 to 2 percent slopes, occasionally flooded
51A	Ethridge clay loam, 0 to 2 percent slopes
52A	Eapa loam, 0 to 2 percent slopes
57A	Attewan loam, 0 to 4 percent Slopes
58A	Verson clay loam, 0 to 4 percent slopes
91A	Kremlin loam, 0 to 2 percent slopes
152A	Eapa-Attewan loams, 0 to 2 percent slopes
158A	Ethridge-Verson clay loams, 0 to 2 percent slopes
292A	Straw-Korchea loams, 0 to 2 percent slopes

Windbreak Suitability Group Species

(The symbol < means less than; > means greater than. Absence of an entry indicates that trees generally do not grow to the indicated height. Soils in windbreak suitability group 4 are not generally suited for windbreak development.)

Windbreak suitability group	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1	Western sandcherry, Nanking cherry	Siberian peashrub, green ash, Rocky Mountain juniper, Tatarian honeysuckle, Siberian crabapple, ponderosa pine, blue spruce, lilac	Russian-olive, Siberian elm	---	---
2M	Western sandcherry, skunkbush sumac	Siberian peashrub, Russian-olive, Rocky Mountain juniper, ponderosa pine	Siberian elm	---	---
2S	Skunkbush sumac	Siberian peashrub, Rocky Mountain juniper, ponderosa pine, common chokecherry, silver buffaloberry	Russian-olive, Siberian elm	---	---
3M	Western sandcherry, Nanking cherry	Siberian peashrub, green ash, Rocky Mountain juniper, Siberian crabapple, ponderosa pine, blue spruce, common chokecherry, lilac	Russian-olive, Siberian elm	---	---
3S	Skunkbush sumac	Siberian peashrub, Rocky Mountain juniper, ponderosa pine, common chokecherry, silver buffaloberry	Russian-olive, Siberian elm	---	---
4	---	---	---	---	---

Windbreak Suitability Groups

(Suitable shrubs and trees with their mature heights are listed in the adjoining Windbreak Suitability Group Species List. Absence of an entry indicates that a windbreak suitability group is not assigned. A dashed entry indicates a woodland unit and a windbreak suitability group are not assigned.)

Soil name and map symbol	Windbreak suitability group
1E:	
Badland	--
2E:	
Rock outcrop	4
3A:	
Riverwash	--
5A:	
Harlake	2M
6A:	
Harlake	2M
7A:	
Lostriver	2S
7B:	
Lostriver	2S
Bullhook	2S
8A:	
Harlake	2M
Havre	1
8B:	
Harlake	2M
Havre	1
9A:	
Havre	1
9B:	
Havre	1
Yamacall	1
10A:	
Havre	1
11A:	
Havre	1
Glendive	2M
11B:	
Havre	1
Glendive	2M
12A:	
Havre	1
Harlake	2M
13A:	
Havre	1

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
14A:	
Havre	1
Glendive	2M
14B:	
Havre	1
Glendive	2M
15A:	
Havre	1
Harlake	2M
16A:	
Havre	1
Yamacall	1
17A:	
Harlake	2M
Havre	1
20B:	
Harlake	2M
Marvan	2S
Vanda	3S
21A:	
McKenzie	--
22B:	
Nobe	4
Absher	4
23A:	
Gerdrum	2S
Vanda	3S
23B:	
Gerdrum	2S
Vanda	3S
Creed	2M
23C:	
Gerdrum	2S
Creed	2M
25A:	
Vanda	3S
26A:	
Weingart	3M
26B:	
Weingart	3M
Warhorse	3M
30C:	
Busby	2M
30D:	
Busby	2M
31B:	
Delpoint	2M

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
31C:	
Delpoint	2M
Cabbart	3M
Yamacall	1
32B:	
Twilight	3M
32D:	
Twilight	4
Blacksheep	4
Rock outcrop	4
33A:	
Yamacall	1
33B:	
Yamacall	1
34A:	
Yamacall	1
34B:	
Yamacall	1
35B:	
Yamacall	1
Busby	2M
36B:	
Yamacall	1
Delpoint	2M
37A:	
Yamacall	1
37B:	
Yamacall	1
38A:	
Kobase	1
Zatoville	2S
38B:	
Zatoville	2S
39B:	
Delpoint	2M
39C:	
Delpoint	2M
Cabbart	3M
Yamacall	1
40B:	
Kobase	1
40C:	
Kobase	1
41A:	
Yamacall	1

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
41B:	
Yamacall	1
41C:	
Yamacall	1
Delpoint	2M
50B:	
Hinterland	3M
50C:	
Hinterland	3M
50D:	
Hinterland	4
Delplain	4
51A:	
Ethridge	1
51B:	
Ethridge	1
52A:	
Eapa	1
52B:	
Eapa	1
53A:	
Tanna	2M
54A:	
Marmarth	3M
56A:	
Crago	3M
Musselshell	2M
Attewan	2M
57A:	
Attewan	2M
57B:	
Attewan	2M
57C:	
Attewan	2M
Niart	2M
58A:	
Verson	2M
60B:	
Abor	3M
60C:	
Abor	3M
Neldore	3M
60D:	
Neldore	3M
Abor	3M

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
60E	
Neldore	4
Abor	4
61D:	
Neldore	4
Neldore, saline	4
61E:	
Neldore	4
Volborg	4
62C:	
Neldore	4
62D:	
Neldore	4
Yawdim	4
62E:	
Neldore	4
Rock outcrop	4
63A:	
Marias	2M
64A:	
Marvan	2S
Vanda	3S
64B:	
Marvan	2S
67D:	
Yawdim	4
68C:	
Megonot	3M
Yawdim	3M
69C:	
Orinoco	3M
Yawdim	3M
73D:	
Yawdim	3M
Abor	3M
73E:	
Yawdim	4
Abor	4
74D:	
Abor	3M
Crago	3M
74E:	
Abor	4
Crago	4
80E:	
Blacksheep	4
Rock outcrop	4
Twilight	4

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
81B:	
Delpoint	2M
Cabbart	3M
81C:	
Delpoint	2M
Cabbart	3M
81D:	
Cabbart	3M
82B:	
Cabbart	3M
Delpoint	2M
82C:	
Cabbart	3M
Delpoint	2M
Rock outcrop	4
82E:	
Cabbart	4
Delpoint	4
Rock outcrop	4
83D:	
Cabbart	4
Rock outcrop	4
Blacksheep	4
84C:	
Cabbart	3M
Yawdim	3M
Delpoint	2M
84D:	
Cabbart	4
Yawdim	4
Rock outcrop	4
84E:	
Cabbart	4
Yawdim	4
Delpoint	4
85A:	
Cabbart	3M
86D:	
Cabbart	3M
Rentsac	3M
86E:	
Cabbart	4
Rock outcrop	4
87B:	
Delpoint	2M
Cabbart	3M
88D:	
Delpoint	4
Cabbart	4
Rock outcrop	4

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
89C:	
Rentsac	3M
90B:	
Chinook	2M
91A:	
Kremlin	1
91B:	
Kremlin	1
92A:	
Binna	2M
93A:	
Crago	3M
Musselshell	2M
93B:	
Crago	3M
94A:	
Crago	3M
94E:	
Crago	4
95A:	
Crago	3M
Musselshell	2M
95B:	
Crago	3M
Attewan	2M
Musselshell	2M
95C:	
Crago	3M
Attewan	2M
95E:	
Yawdim	4
Crago	4
96E:	
Crago	4
Abor	4
97A:	
Musselshell	2M
Crago	3M
97B:	
Musselshell	2M
Crago	3M
98A:	
Niart	2M
98B:	
Niart	2M
Crago	3M

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
98C:	
Niart	2M
Crago	3M
98D:	
Niart	2M
Rothiemay	1
123C:	
Creed	2M
Gerdrum	2S
130B:	
Busby	2M
Twilight	3S
131C:	
Delpoint	2M
Yamacall	1
132B:	
Twilight	3M
Blacksheep	3M
138B:	
Zatoville	2S
Orinoco	3M
140B:	
Kobase	1
Megonot	3M
140C:	
Kobase	1
Megonot	3M
142A:	
Rothiemay	1
142B:	
Rothiemay	1
142C:	
Rothiemay	1
Crago	3M
152A:	
Eapa	1
Attewan	2M
153C:	
Tanna	2M
Cabbart	3M
153D:	
Cabbart	3M
Tanna	2M
154C:	
Marmarth	3M
Cabbart	3M

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
154D:	
Cabbart	3M
Marmarth	3M
158A:	
Ethridge	1
Verson	2M
167D:	
Yawdim	3M
Orinoco	3M
167E:	
Yawdim	4
Orinoco	4
181D:	
Cabbart	3M
Crago	3M
Delpoint	2M
181E:	
Cabbart	4
Crago	4
Delpoint	4
189C:	
Rentsac	3M
Cabbart	3M
189E:	
Rentsac	4
Rock outcrop	4
230C:	
Macar	1
232E:	
Hughesville	--
Tibs	--
Whitecow	--
234F:	
Tibs	--
Whitecow	--
240E:	
Ridge	--
Dast	--
Rock outcrop	--
241E:	
Twilight	--
Blacksheep	--
Rock outcrop	--
242D:	
Dast	--
Ridge	--

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
242F:	
Ridge	--
Dast	--
243F:	
Blacksheep	--
Twilight	--
245C:	
Lamedeer	--
Ringling	--
245F:	
Lamedeer	--
Ringling	--
246F:	
Lamedeer	--
Ringling	--
250E:	
Macmeal	--
Rock outcrop	--
251C:	
Savage	1
252D:	
Hilger	4
Rock outcrop	4
252E:	
Hilger	4
254C:	
Fergus	1
255C:	
Shambo	--
Korchea	--
Barvon	--
255D:	
Barvon	--
Cabba	--
Shambo	--
256C:	
Yamacall	--
Havre	--
Delpoint	--
260F:	
Kuro	4
Wayden	4
Rock outcrop	4
261F:	
Wayden	4
Castner	4

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
262E:	
Wayden	4
Windham	3M
280D:	
Cabbart	--
Delpoint	--
280E:	
Castner	4
Kuro	4
281D:	
Doney	--
Cabba	--
Macar	--
281E:	
Castner	4
Rock outcrop	4
282D:	
Castner	4
283D:	
Barvon	--
Cabba	--
283F:	
Cabba	--
Rock outcrop	4
284D:	
Cabba	--
Barvon	--
284F:	
Doney	4
Wayden	4
285D:	
Cabba	--
Doney	--
285F:	
Cabba	--
Doney	--
286F:	
Cabbart	--
Rock outcrop	4
287D:	
Delpoint	--
Cabbart	--
287F:	
Cabbart	--
Delpoint	--

Windbreak Suitability Groups--Continued

Soil name and map symbol	Windbreak suitability group
288D:	
Delpoint	--
Cabbart	--
Havre	--
288F:	
Cabbart	--
Delpoint	--
289D:	
Barvon	--
Cabba	--
Korchea	--
289F:	
Cabba	--
Barvon	--
291C:	
Windham	3M
292A:	
Straw	1
Korchea	1
294C:	
Shambo	1
295F:	
Bitton	4
Winifred	4
Castner	4
296D:	
Borky	3M
Sinnigam	3M

Range

Range makes up about 65 percent of the land in Musselshell County. The areas of range provide forage for about 31,900 cow-calf pairs and 16,400 sheep and lambs. Nearly 81 percent of the farm income in the county is derived from the sale of livestock. The average size of the ranches is about 4,070 acres.

Most grazing is on native range. The range is used primarily for grazing by domestic livestock; however, it also is used as wildlife habitat, recreational areas, and watershed and has esthetic value.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on range are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Range is defined as land on which the native vegetation (the climax, or natural potential, plant community) is predominantly grasses, grasslike plants, forbs, and shrubs suitable for grazing and browsing. Range includes natural grasslands, savannas, many wetlands, some deserts, tundra, and certain shrub and forb communities. Range receives no regular or frequent cultural treatment. The composition and production of the plant community are determined by soil, climate, topography, overstory canopy, and grazing management.

Grazed forest land is defined as land on which the understory includes, as an integral part of the forest plant community, plants that can be grazed without significant impairment of other forest values.

Native pasture is defined as land on which the potential (climax) vegetation is forest but which is used and managed primarily for the production of native forage plants. Native pasture includes cutover forest land and forest land that has been cleared and is managed for native or naturalized forage plants.

The tables "Range Site Name" and "Range Site Species List" at the end of this section show, for each listed soil, the range site and the characteristic vegetation. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in this table follows.

Range site is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants.

Many different range sites are in the survey area. Over time, the combination of plants best suited to a particular soil and climate has become established. If the soil is not excessively disturbed, this group of plants is the natural plant community for the site. Natural plant communities are not static but vary slightly from year to year and place to place.

The relationship between soils and vegetation was ascertained during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important. The "Field Office Technical Guide," which is available at local offices of the Natural Resources Conservation Service, can provide specific information about range sites.

Characteristic vegetation consists of the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil. The plants are listed by common name.

General Range Sites in Musselshell County

The following general range site descriptions of the county are grouped by their dominant soil and topographic characteristics, and are listed in order of natural productivity.

Soil groups that have the potential to be the most productive range sites because they receive more soil moisture than other sites:

Subirrigated range site. This range site occurs on very deep, poorly to somewhat poorly drained soils and is mainly along flood plains. The water table is rarely above the surface but an effective ground water table occurs throughout the growing season. Slopes range from 0 to 2 percent.

Saline lowland range site. This range site occurs on very deep, somewhat poorly drained soils that are on flood plains and drainageways. Slopes range from 0 to 2 percent.

Overflow range site. This range site occurs on very deep, very poorly to well drained soils on flood plains and in closed depressions. Slopes are from 0 to 2 percent.

Soil groups with no obvious soils or moisture limiting factors. The vegetation can make a normal response to climate:

Sandy range site. This site occurs on moderately deep to very deep, well drained soils on uplands and flood plains. Slopes range from 0 to 15 percent. The soils have a coarse textured surface layer.

Silty range site. This range site occurs on moderately deep to very deep, well drained soils on uplands and flood plains. Slopes range from 0 to 15 percent. The soils have a medium textured surface layer. Permeability is moderate to slow.

Clayey range site. This range site occurs on moderately deep to very deep, well drained soils on uplands and flood plains. Slopes range from 0 to 15 percent. The soils have a fine textured surface layer. Permeability is slow to very slow.

Soil groups with soil properties or topographic features that limit available moisture or affect infiltration:

Silty, limy phase range site. This range site occurs on moderately deep to very deep soils on alluvial fans, stream terraces, and hills. The soils have a high content of lime (greater than 15 percent calcium carbonate equivalent) within 6 inches of the soil surface. The surface layer is medium textured. Slopes are less than 45 percent.

Thin silty range site. This site occurs on moderately deep to very deep soils on uplands. Slopes are more than 15 percent. These soils have a thin, loamy, dark surface layer. Although they take in water readily, much of the moisture runs off due to steeper slopes. Typically calcium carbonates are present throughout much of the soil profile.

Thin clayey range site. This site occurs on moderately deep to very deep soils on uplands. Slopes are more than 15 percent. These soils have a thin, clayey surface layer. Permeability is slow to very slow, resulting in high runoff. The soils are consequently droughty.

Shallow to gravel range site. This range site occurs on very deep, well to excessively drained soils. The underlying material is high in sand and gravel. Permeability is rapid at shallow depths. Little water is stored in the soils profile.

Coarse clay range site. This range site occurs on undulating to rolling alluvial fans, footslopes, and low ridges in sedimentary plains. The soils are mainly formed from acid clay shale and contain many very fine shale fragments. They are less than 40 inches deep over clay shale bedrock and are on slopes of less than 15 percent. The soils are highly susceptible to wind erosion and have low available water capacity.

Shallow range site. This range site occurs on sedimentary plains and hills. The soils are loamy and have bedrock at depths of 10 to 20 inches. These soils take in water readily, but available water capacity is low.

Shallow clayey range site. This range site occurs on clayey soils that overlie shale at depths of 10 to 20 inches. It occurs on sedimentary plains and hills. Permeability is slow to very slow, with considerable moisture lost to runoff.

Claypan range site. This range site occurs on moderately deep to very deep soils on alluvial fans and stream terraces. Slopes range from 0 to 8 percent. It is commonly intermingled with a silty range site. The soils have a medium textured surface layer underlain by a hard, dense, slowly permeable restrictive layer at 2 to 8 inches. This layer generally has a high concentration of sodium.

Dense clay range site. This range site occurs on moderately deep to very deep soils on till plains or stream terraces. Slopes range from 0 to 8 percent. It is commonly intermingled with a silty range site. These soils are high in dispersed clay throughout the profile or very near the soil surface. Permeability is slow or very slow, organic matter is low, and varying amounts of salts are in the subsoil. Roots cannot penetrate deeply.

Gravel range site. This range site occurs on soils over 20 inches deep. The top 6 inches have at least 35 percent, by volume, gravel or cobbles with a sandy texture. The lower profile has over 50 percent, by volume, gravel or cobbles. These soils take in water rapidly but are very droughty as drainage is excessive with very low water holding capacity.

Saline upland range site. This range site occurs on very deep, very poorly to well drained soils. Slopes range from 0 to 2 percent. The soils have a clayey surface layer. The profile is characterized by high salinity or alkalinity or both. Underlying material is loamy to clayey. Permeability is slow to very slow. The majority of the vegetation is salt tolerant.

Range Condition

Range condition is based on a comparison of the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the natural community, the better the range condition.

Abnormal disturbances that change the natural plant community include repeated overuse by livestock, excessive burning, erosion, and plowing. Grazing animals select the most palatable plants. These plants will eventually die if they are continually grazed. A very severe disturbance can completely destroy the natural community. Under these conditions, the less desirable plants, such as annuals and weedlike plants, can invade. If the plant community has not deteriorated significantly, it eventually can return to dominantly natural plants if proper grazing management is applied.

Four range condition classes are used to show the degree of deterioration of the natural plant community.

An area of rangeland is in *excellent condition* if more than 75 percent of the present plant community is the same as the natural plant community. It is in *good condition* if the natural plants make up 51 to 75 percent of the present plant community, in *fair condition* if those plants make up 26 to 50 percent, and in *poor condition* if they make up less than 25 percent.

Knowledge of the range site and condition is necessary as a basis for planning and applying the management needed to maintain or improve the desired plant community for selected uses. Such information is needed to determine management objectives, proper grazing systems and stocking rates, suitable wildlife management practices, the potential for recreational uses, and the condition of watersheds.

Rangeland Management

Rangeland management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of less desirable species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Grazing management is the most important part of any rangeland management program. Proper grazing use, timely deferment of grazing, and planned rotation grazing systems are key practices. The experience of ranchers and research have shown that if no more than one-half of the current year's growth is grazed, a plant community in good or excellent condition can be maintained and one in fair condition can be improved. The remaining one-half enables plants to make and store food for regrowth and root development. As a result, the desirable plants remain healthy and are not replaced by less desirable grasses and weeds. Also, the plant cover protects the soil from water erosion and soil blowing, improves tilth, increases the rate of water infiltration, and helps to control runoff.

Certain practices commonly are needed to obtain a uniform distribution of grazing. These include developing livestock watering facilities, fencing, properly locating salt and mineral supplements, constructing livestock trails in steeply sloping areas, and riding or herding.

Various kinds of grazing systems can be used in range management. No single grazing system is best under all conditions. The grazing system should increase the quantity and improve the quality of the range vegetation, should meet the needs of the individual operator, and should be designed according to the topography, the type of grazing animals, and the resource management objectives.

Special improvement practices are needed in areas where management practices do not achieve the desired results or where recovery is too slow under forage management alone. These include range seeding, brush management, water spreading, prescribed burning, and mechanical treatment.

Some soils are suited to mechanical treatment for range improvement. On other soils, however, only proper grazing management can improve the range. Many soils in capability classes 1 through 4 are suited to such practices as seeding, mechanical brush and weed control, and water spreading. Those in capability classes 7 and 8, however, are not suitable. Many soils in capability classes 1 through 4 are suited to tillage for seedbed preparation before native or introduced forage plant species are seeded. Soils in capability class 6 may be suited to limited surface disturbance, such as scarification, for the purpose of seeding and as a means of increasing the rate of water infiltration for seed germination.

Where feasible, mechanical renovation practices, such as shallow chiseling, can help to speed recovery of the desired plants. These practices open up the surface and thus allow the absorption of more moisture and production of the more desirable plants. Mechanical renovation, brush management, and timely deferment of grazing allow recovery of the desired plants.

Seeding may be needed in areas where the less desirable plants are dominant. A clean, firm seedbed should be prepared, suitable species should be selected for seeding, and rest periods should be long enough to allow the new plants to become established.

Special improvement practices can be effective only if the management system helps to keep the desirable plants healthy.

Woodland Understory Vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. If well managed, some woodland can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the age and kind of trees in the canopy, the density of the canopy, the depth and condition of the litter, and the kind of soil. The density of the canopy determines the amount of light that understory plants receive.

The “Woodland Understory Vegetation and Habitat Types” table shows, for each soil sutable for woodland, the potential for producing understory vegetation. The *total production* of understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants up to a height of 4.5 feet. It is expressed in pounds per acre of air-dry vegetation in favorable, normal, and unfavorable years. In a favorable year, soil moisture is above average during the optimal part of the growing season; in a normal year, soil moisture is average; and in an unfavorable year, it is below average.

The table also lists the common names of the *characteristic vegetation* on each soil and the *composition*, by percentage of air-dry weight, of each kind of plant. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of woodland in which the production of wood crops is highest. The representative habitat type or phase displayed in this table is documented in the Pfister system (Pfister and others, 1977.)

Range Site Names

(Detailed information on a specific range site is located in the Technical Range Site Description, Field Office Technical Guide, at the Natural Resources Conservation Service Field Office. Absence of an entry or a label of (forested soil) indicates that a range site is not assigned.)

Soil name and map symbol	Range site name
5A:	
Harlake	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
6A:	
Harlake	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
7A:	
Lostriver	Saline lowland, 10 to 14 inch Ppt zone, sedimentary plains, East
7B:	
Lostriver	Saline lowland, 10 to 14 inch Ppt zone, sedimentary plains, East
Bullhook	Saline lowland, 10 to 14 inch Ppt zone, sedimentary plains, East
8A:	
Harlake	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
8B:	
Harlake	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Havre	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
9A:	
Havre	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
9B:	
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
10A:	
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
11A:	
Havre	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Glendive	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
11B:	
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Glendive	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
12A:	
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Harlake	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
13A:	
Havre	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
14A:	
Havre	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Glendive	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
14B:	
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Glendive	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
15A:	
Havre	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Harlake	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East

Range Site Names--Continued

Soil name and map symbol	Range site name
16A:	
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
17A:	
Harlake	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Havre	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
20B:	
Harlake	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Marvan	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Vanda	Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, East
21A:	
McKenzie	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
22B:	
Nobe	Saline upland, 10 to 14 inch Ppt zone, sedimentary plains, East
Absher	Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, East
23A:	
Gerdrum	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
Vanda	Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, East
23B:	
Gerdrum	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
Vanda	Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Creed	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
23C:	
Gerdrum	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
Creed	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
25A:	
Vanda	Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, East
26A:	
Weingart	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
26B:	
Weingart	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
Warhorse	Shallow Clay, 10 to 14 inch Ppt zone, sedimentary plains, East
30C:	
Busby	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
30D:	
Busby	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
31B:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
31C:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
32B:	
Twilight	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
32D:	
Twilight	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
Blacksheep	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East

Range Site Names--Continued

Soil name and map symbol	Range site name
33A:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
33B:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
34A:	
Yamacall	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
34B:	
Yamacall	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
35B:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Busby	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
36B:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
37A:	
Yamacall	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
37B:	
Yamacall	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
38A:	
Kobase	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Zatoville	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
38B:	
Zatoville	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
39B:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
39C:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
40B:	
Kobase	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
40C:	
Kobase	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
41A:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
41B:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
41C:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
50B:	
Hinterland	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
50C:	
Hinterland	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East

Range Site Names--Continued

Soil name and map symbol	Range site name
50D:	
Hinterland	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Delplain	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
51A:	
Ethridge	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
51B:	
Ethridge	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
52A:	
Eapa	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
52B:	
Eapa	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
53A:	
Tanna	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
54A:	
Marmarth	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
56A:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Musselshell	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Attewan	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
57A:	
Attewan	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
57B:	
Attewan	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
57C:	
Attewan	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
Niart	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
58A:	
Verson	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, Central
60B:	
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
60C:	
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
60D:	
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
60E:	
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Abor	Thin clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
61D:	
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Neldore, saline	Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, east
61E:	
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Volborg	Coarse clay, 10 to 14 inch Ppt zone, sedimentary plains, East
62C:	
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East

Range Site Names--Continued

Soil name and map symbol	Range site name
62D:	
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
62E:	
Neldore	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
63A:	
Marias	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
64A:	
Marvan	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Vanda	Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, east
64B:	
Marvan	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
67D:	
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
68C:	
Megonot	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
69C:	
Orinoco	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
73D:	
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
73E:	
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
74D:	
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
74E:	
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
80E:	
Blacksheep	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Twilight	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
81B:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
81C:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
81D:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
82B:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East

Range Site Names--Continued

Soil name and map symbol	Range site name
82C:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
82E:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
83D:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Blacksheep	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
84C:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	Thin silty, 10 to 14 inch Ppt zone, sedimentary plains, East
84D:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
84E:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	Thin silty, 10 to 14 inch Ppt zone, sedimentary plains, East
85A:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
86D:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Rentsac	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
86E:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
87B:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
88D:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
89C:	
Rentsac	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
90B:	
Chinook	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
91A:	
Kremlin	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
91B:	
Kremlin	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
92A:	
Binna	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
93A:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Musselshell	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
93B:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central

Range Site Names--Continued

Soil name and map symbol	Range site name
94A:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
94E:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
95A:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Musselshell	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
95B:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Attewan	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
Musselshell	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
95C:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Attewan	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
95E:	
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
96E:	
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Abor	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, Central
97A:	
Musselshell	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
97B:	
Musselshell	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
98A:	
Niart	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
98B:	
Niart	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
98C:	
Niart	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
98D:	
Niart	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
Rothiemay	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
123C:	
Creed	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
Gerdrum	Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East
130B:	
Busby	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
Twilight	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
131C:	
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
132B:	
Twilight	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East

Range Site Names--Continued

Soil name and map symbol	Range site name
138B:	
Zatoville	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Orinoco	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
140B:	
Kobase	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Megonot	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
140C:	
Kobase	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Megonot	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
142A:	
Rothiemay	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
142B:	
Rothiemay	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
142C:	
Rothiemay	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
152A:	
Eapa	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
Attewan	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
153C:	
Tanna	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
153D:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Tanna	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
154C:	
Marmarth	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
154D:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Marmarth	Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East
158A:	
Ethridge	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, Central
Verson	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, Central
167D:	
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Orinoco	Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
167E:	
Yawdim	Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East
Orinoco	Thin clayey, 10 to 14 inch Ppt zone, sedimentary plains, East
181D:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central
181E:	
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, Central
Crago	Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central
Delpoint	Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central

Range Site Names--Continued

Soil name and map symbol	Range site name
189C:	
Rentsac	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
189E:	
Rentsac	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
230C:	
Macar	Silty, 15 to 19 inch Ppt zone, sedimentary plains, East
232E:	
Hughesville	(forested soil)
Tibs	(forested soil)
Whitecow	(forested soil)
234F:	
Tibs	(forested soil)
Whitecow	(forested soil)
240E:	
Ridge	(forested soil)
Dast	(forested soil)
241E:	
Twilight	(forested soil)
Blacksheep	(forested soil)
242D:	
Dast	(forested soil)
Ridge	(forested soil)
242F:	
Ridge	(forested soil)
Dast	(forested soil)
243F:	
Blacksheep	(forested soil)
Twilight	(forested soil)
245C:	
Lamedeer	(forested soil)
Ringling	(forested soil)
245F:	
Lamedeer	(forested soil)
Ringling	(forested soil)
246F:	
Lamedeer	(forested soil)
Ringling	(forested soil)
250E:	
Macmeal	(forested soil)
251C:	
Savage	Clayey, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
252D:	
Hilger	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
252E:	
Hilger	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central

Range Site Names--Continued

Soil name and map symbol	Range site name
254C:	
Fergus	Clayey, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
255C:	
Shambo	Silty, 15 to 19 inch Ppt zone, sedimentary plains, East
Korchea	Overflow, 15 to 19 inch Ppt zone, sedimentary plains, East
Barvon	(forested soil)
255D:	
Barvon	(forested soil)
Cabba	(forested soil)
Shambo	Silty, 15 to 19 inch Ppt zone, sedimentary plains, East
256C:	
Yamacall	Silty, 10 to 14 inch Ppt zone, sedimentary plains, East
Havre	Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East
Delpoint	(forested soil)
260F:	
Kuro	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Wayden	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
261F:	
Wayden	Shallow clay, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Castner	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
262E:	
Wayden	Shallow clay, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Windham	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
280D:	
Cabbart	(forested soil)
Delpoint	(forested soil)
280E:	
Castner	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Kuro	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
281D:	
Doney	Silty, 15 to 19 inch Ppt zone, sedimentary plains, East
Cabba	(forested soil)
Macar	Silty, 15 to 19 inch Ppt zone, sedimentary plains, East
281E:	
Castner	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
282D:	
Castner	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
283D:	
Barvon	(forested soil)
Cabba	(forested soil)
283F:	
Cabba	(forested soil)
284D:	
Cabba	(forested soil)
Barvon	(forested soil)

Range Site Names--Continued

Soil name and map symbol	Range site name
284F:	
Doney	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Wayden	Shallow clay, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
285D:	
Cabba	(forested soil)
Doney	Silty, 15 to 19 inch Ppt zone, sedimentary plains, East
285F:	
Cabba	(forested soil)
Doney	Silty, 15 to 19 inch Ppt zone, sedimentary plains, East
286F:	
Cabbart	(forested soil)
287D:	
Delpoint	(forested soil)
Cabbart	Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East
287F:	
Cabbart	(forested soil)
Delpoint	(forested soil)
288D:	
Delpoint	(forested soil)
Cabbart	(forested soil)
Havre	Overflow, 15 to 19 inch Ppt zone, sedimentary plains, East
288F:	
Cabbart	(forested soil)
Delpoint	(forested soil)
289D:	
Barvon	(forested soil)
Cabba	(forested soil)
Korchea	Overflow, 15 to 19 inch Ppt zone, sedimentary plains, East
289F:	
Cabba	(forested soil)
Barvon	(forested soil)
291C:	
Windham	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
292A:	
Straw	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Korchea	Overflow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
294C:	
Shambo	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
295F:	
Bitton	Thin silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Winifred	Clayey, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Castner	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
296D:	
Borky	Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central
Sinnigam	Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central

Range Site Species List

(The range site species list is a list of grass, forb, and shrub species typical to a range site in good to excellent condition.)

Range site	Characteristic vegetation
Clayey, 10 to 14 inch Ppt zone, sedimentary plains, Central	Western wheatgrass Thickspike wheatgrass Green needlegrass Bluebunch wheatgrass Big sagebrush Winterfat Biscuitroot Needleleaf sedge
Clayey, 10 to 14 inch Ppt zone, sedimentary plains, East	Green needlegrass Western wheatgrass Thickspike wheatgrass Bluebunch wheatgrass Big sagebrush Needleleaf sedge Little bluestem
Clayey, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central	Western wheatgrass Green needlegrass Bluebunch wheatgrass Idaho fescue Needleleaf sedge Thermopsis Astagalis Big sagebrush
Claypan, 10 to 14 inch Ppt zone, sedimentary plains, East	Western wheatgrass Green needlegrass Alkali bluegrass Alkali sacaton Winterfat Big sagebrush Alkali bluegrass
Coarse clay, 10 to 14 inch Ppt zone, sedimentary plains, East	Prairie sandreed Bluebunch wheatgrass Westerm wheatgrass Longleaf sagebrush Prairie thermopsis Rubber rabbitbrush
Dense clay, 10 to 14 inch Ppt zone, sedimentary plains, East	Western wheatgrass Fourwing saltbrush Inland saltgrass Alkali sacoton Big sagebrush Black greasewood
Overflow, 10 to 14 inch Ppt zone, sedimentary plains, East	Big bluestem Basin wildrye Green needlegrass Western wheatgrass Little bluestem Prairie cordgrass Nebraska sedge Common snowberry

Range Site Species List--Continued

Range site	Characteristic vegetation
Overflow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central	Green needlegrass Basin wildrye Western wheatgrass Silver sagebrush Common snowberry Woods rose Lupine Prairiesmoke
Overflow, 15 to 19 inch Ppt zone, sedimentary plains, East	Little bluestem Green needlegrass Big bluestem Western wheatgrass Basin wildrye Silver sagebrush Common snowberry Prairie thermopsis
Saline lowland, 10 to 14 inch Ppt zone, sedimentary plains, East	Alkali sacaton Alkali cordgrass Nuttall alkaligrass Western wheatgrass Inland saltgrass Nuttall saltbush Black greasewood Basin wildrye
Saline upland, 10 to 14 inch Ppt zone, sedimentary plains, East	Alkali sacaton Western wheatgrass Thickspike wheatgrass Inland saltgrass Fourwing saltbush Black greasewood Nuttall alkaligrass
Sandy, 10 to 14 inch Ppt zone, sedimentary plains, East	Prairie sandreed Little bluestem Needleandthread Western wheatgrass Big bluestem Threadleaf sedge Indian ricegrass
Shallow, 10 to 14 inch Ppt zone, sedimentary plains, Central	Bluebunch wheatgrass Needleandthread Western wheatgrass Green needlegrass Skunkbush sumac Woods rose Eriogonum
Shallow, 10 to 14 inch Ppt zone, sedimentary plains, East	Little bluestem Bluebunch wheatgrass Sideoats gramma Needleandthread Plains muhly Green needlegrass Skunkbush sumac

Range Site Species List--Continued

Range site	Characteristic vegetation
Shallow, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central	Idaho fescue Green needlegrass Western wheatgrass Snowberry Skunkbush sumac Woods rose Creeping juniper
Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, Central	Western wheatgrass Green needlegrass Bluebunch wheatgrass Needleandthread Thickspike wheatgrass Big sagebrush Scarlet globemallow
Shallow clay, 10 to 14 inch Ppt zone, sedimentary plains, East	Western wheatgrass Green needlegrass Little bluestem Bluebunch wheatgrass Thickspike wheatgrass Threadleaf sedge Big sagebrush Scarlet globemallow
Shallow clay, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central	Bluebunch wheatgrass Idaho fescue Green needlegrass Western wheatgrass Needleandthread Eriogonum Big sagebrush
Silty, 10 to 14 inch Ppt zone, sedimentary plains, Central	Bluebunch wheatgrass Western wheatgrass Green needlegrass Needleandthread Prairie junegrass Hairy goldenaster Atragolis Silver sagebrush
Silty, 10 to 14 inch Ppt zone, sedimentary plains, East	Western wheatgrass Green needlegrass Little bluestem Bluebunch wheatgrass Needleandthread Blue grama Threadleaf sedge Hairy goldenaster Silver sagebrush
Silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central	Bluebunch wheatgrass Western wheatgrass Green needlegrass Idaho fescue Lupine Prairiesmoke Common snowberry

Range Site Species List--Continued

Range site	Characteristic vegetation
Silty, 15 to 19 inch Ppt zone, sedimentary plains, East	Bluebunch wheatgrass Green needlegrass Little bluestem Western wheatgrass Idaho fescue Needleandthread Astragolis Common snowberry
Silty, limy, 10 to 14 inch Ppt zone, sedimentary plains, Central	Bluebunch wheatgrass Western wheatgrass Needleandthread Green needlegrass Hairy goldenaster Big sagebrush
Thin clayey, 10 to 14 inch Ppt zone, sedimentary plains, East	Western wheatgrass Bluebunch wheatgrass Little bluestem Needleandthread Plains muhly Common snowberry
Thin silty, 10 to 14 inch Ppt zone, sedimentary plains, East	Bluebunch wheatgrass Western wheatgrass Little bluestem Needleandthread Plains muhly Common snowberry
Thin silty, 15 to 19 inch Ppt zone, northern Rocky Mountain foothills, Central	Bluebunch wheatgrass Western wheatgrass Needleandthread Idaho fescue Green needlegrass Skunkbush sumac Common snowberry Woods rose

Woodland Understory Vegetation and Habitat Types

(Absence of an entry indicates that data were not available.)

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
8B:					
Havre	Favorable	1,800	Western wheatgrass	25	---
	Normal	1,500	Green needlegrass	20	
	Unfavorable	1,200	Needleandthread	20	
			Bluebunch wheatgrass	10	
			Big bluestem	5	
			Silver sagebrush	5	
9A:					
Havre	Favorable	1,800	Western wheatgrass	25	---
	Normal	1,500	Green needlegrass	20	
	Unfavorable	1,200	Needleandthread	20	
			Bluebunch wheatgrass	10	
			Big bluestem	5	
			Silver sagebrush	5	
11A:					
Havre	Favorable	1,800	Western wheatgrass	25	---
	Normal	1,500	Green needlegrass	20	
	Unfavorable	1,200	Needleandthread	20	
			Bluebunch wheatgrass	10	
			Big bluestem	5	
			Silver sagebrush	5	
232E:					
Hughesville	Favorable	200	Bluebunch wheatgrass	25	Douglas-fir/bluebunch wheatgrass
	Normal	150	Common snowberry	20	
	Unfavorable	100	Arrowleaf balsamroot	10	
			Idaho fescue	10	
			Rough fescue	10	
			White spirea	5	
			Common juniper	1	
			Oregongrape	1	
			Saskatoon serviceberry	1	
Tibs	Favorable	500	Pinegrass	15	Douglas-fir/bluebunch wheatgrass
	Normal	400	Common snowberry	10	
	Unfavorable	200	Heartleaf arnica	10	
			Oregongrape	10	
			Russet buffaloberry	10	
			White spirea	10	
			Common chokecherry	5	
			Woods rose	5	
Whitecow	Favorable	200	Bluebunch wheatgrass	60	Douglas-fir/bluebunch wheatgrass
	Normal	150	Rough fescue	15	
	Unfavorable	100	Arrowleaf balsamroot	5	
			Skunkbush sumac	5	
			Rocky Mountain juniper	2	
			Saskatoon serviceberry	2	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
234F:					
Tibs	Favorable	500	Pinegrass	15	Douglas-fir/bluebunch wheatgrass
	Normal	400	Common snowberry	10	
	Unfavorable	200	Heartleaf arnica	10	
			Oregongrape	10	
			Russet buffaloberry	10	
			White spirea	10	
			Common chokecherry	5	
			Woods rose	5	
Whitecow	Favorable	200	Bluebunch wheatgrass	60	Douglas-fir/bluebunch wheatgrass
	Normal	150	Rough fescue	15	
	Unfavorable	100	Arrowleaf balsamroot	5	
			Skunkbush sumac	5	
			Rocky Mountain juniper	2	
			Saskatoon serviceberry	2	
240E:					
Ridge	Favorable	500	Little bluestem	20	Ponderosa pine/bluebunch wheatgrass
	Normal	400	Prairie sandreed	15	
	Unfavorable	300	Western wheatgrass	15	
			Green needlegrass	10	
			Common juniper	5	
			Needleandthread	5	
			Skunkbush sumac	5	
			Yucca	5	
			Bluebunch wheatgrass	1	
			Common snowberry	1	
			Silver sagebrush	1	
Dast	Favorable	600	Bluebunch wheatgrass	40	Ponderosa pine/bluebunch wheatgrass
	Normal	400	Little bluestem	15	
	Unfavorable	300	Idaho fescue	10	
			Prairie sandreed	10	
			Common juniper	5	
			Green needlegrass	5	
			Needleandthread	5	
			Sedge	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	
241E:					
Twilight	Favorable	700	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Needleandthread	15	
	Unfavorable	500	Prairie sandreed	15	
			Little bluestem	10	
			Sedge	10	
			Western wheatgrass	10	
			Common juniper	5	
			Skunkbush sumac	5	
			Unnamed perennial forbs	5	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
241E:(cont.)					
Blacksheep	Favorable	900	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	700	Needleandthread	15	
	Unfavorable	500	Prairie sandreed	15	
			Unnamed perennial forbs	10	
			Indian ricegrass	5	
			Little bluestem	5	
			Sedge	5	
			Silver sagebrush	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	
			Yucca	5	
242D:					
Dast	Favorable	800	Bluebunch wheatgrass	35	Ponderosa pine/bluebunch wheatgrass
	Normal	700	Green needlegrass	20	
	Unfavorable	600	Idaho fescue	10	
			Sedge	10	
			Common chokecherry	5	
			Common snowberry	5	
			Western wheatgrass	5	
			Common juniper	1	
			Skunkbush sumac	1	
Ridge	Favorable	600	Bluebunch wheatgrass	35	Ponderosa pine/bluebunch wheatgrass
	Normal	500	Green needlegrass	20	
	Unfavorable	400	Sedge	10	
			Arrowleaf balsamroot	5	
			Common chokecherry	5	
			Common juniper	5	
			Common snowberry	5	
			Idaho fescue	5	
			Western wheatgrass	5	
242F:					
Ridge	Favorable	600	Bluebunch wheatgrass	35	Ponderosa pine/bluebunch wheatgrass
	Normal	500	Green needlegrass	20	
	Unfavorable	400	Sedge	10	
			Arrowleaf balsamroot	5	
			Common chokecherry	5	
			Common juniper	5	
			Common snowberry	5	
			Idaho fescue	5	
			Western wheatgrass	5	
Dast	Favorable	600	Bluebunch wheatgrass	35	Ponderosa pine/bluebunch wheatgrass
	Normal	500	Green needlegrass	20	
	Unfavorable	400	Idaho fescue	10	
			Sedge	10	
			Common chokecherry	5	
			Common snowberry	5	
			Western wheatgrass	5	
			Common juniper	1	
			Skunkbush sumac	1	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
243F:					
Blacksheep-------	Favorable	800	Bluebunch wheatgrass---------	35	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Little bluestem--------------	15	
	Unfavorable	500	Needleandthread--------------	10	
			Unnamed perennial forbs------	10	
			Western wheatgrass-----------	10	
			Common snowberry-------------	5	
			Sedge------------------------	5	
			Skunkbush sumac--------------	5	
Twilight---------	Favorable	700	Bluebunch wheatgrass---------	30	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Western wheatgrass-----------	15	
	Unfavorable	500	Common snowberry-------------	10	
			Little bluestem--------------	10	
			Needleandthread--------------	10	
			Sedge------------------------	10	
			Common juniper---------------	5	
			Skunkbush sumac--------------	5	
			Unnamed perennial forbs------	5	
245C:					
Lamedeer---------	Favorable	800	Columbia needlegrass---------	15	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Idaho fescue-----------------	15	
	Unfavorable	400	Common chokecherry-----------	10	
			Common snowberry-------------	10	
			Arrowleaf balsamroot---------	5	
			Big bluestem-----------------	5	
			Bluebunch wheatgrass---------	5	
			Oregongrape------------------	5	
			Saskatoon serviceberry-------	5	
			Little bluestem--------------	1	
			Russet buffaloberry----------	1	
			White spirea-----------------	1	
Ringling---------	Favorable	800	Bluebunch wheatgrass---------	25	Ponderosa pine/bluebunch wheatgrass
	Normal	500	Idaho fescue-----------------	20	
	Unfavorable	300	Arrowleaf balsamroot---------	10	
			Little bluestem--------------	10	
			Common snowberry-------------	5	
			Needleandthread--------------	5	
			Sideoats grama---------------	5	
			Skunkbush sumac--------------	5	
245F:					
Lamedeer---------	Favorable	800	Columbia needlegrass---------	15	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Idaho fescue-----------------	15	
	Unfavorable	400	Common chokecherry-----------	10	
			Common snowberry-------------	10	
			Arrowleaf balsamroot---------	5	
			Big bluestem-----------------	5	
			Bluebunch wheatgrass---------	5	
			Oregongrape------------------	5	
			Saskatoon serviceberry-------	5	
			Little bluestem--------------	1	
			Russet buffaloberry----------	1	
			White spirea-----------------	1	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
245F: (cont.)					
Ringling	Favorable	800	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	500	Idaho fescue	20	
	Unfavorable	300	Arrowleaf balsamroot	10	
			Little bluestem	10	
			Common snowberry	5	
			Needleandthread	5	
			Sideoats grama	5	
			Skunkbush sumac	5	
246F:					
Lamedeer	Favorable	800	Russet buffaloberry	25	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Common chokecherry	15	
	Unfavorable	400	Saskatoon serviceberry	10	
			White spirea	10	
			Columbia needlegrass	5	
			Common snowberry	5	
			Heartleaf arnica	5	
			Idaho fescue	5	
			Kinnikinnick	5	
			Oregongrape	5	
Ringling	Favorable	800	Common snowberry	10	Ponderosa pine/bluebunch wheatgrass
	Normal	500	Heartleaf arnica	10	
	Unfavorable	300	Idaho fescue	10	
			Poverty danthonia	10	
			Rough fescue	10	
			Russet buffaloberry	10	
			Arrowleaf balsamroot	5	
			Little bluestem	5	
250E:					
Macmeal	Favorable	300	Bluebunch wheatgrass	40	Ponderosa pine/bluebunch wheatgrass
	Normal	250	Little bluestem	20	
	Unfavorable	200	Arrowleaf balsamroot	10	
			Common snowberry	5	
			Skunkbush sumac	5	
			Common chokecherry	1	
			Saskatoon serviceberry	1	
255C:					
Barvon	Favorable	700	Idaho fescue	25	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Bluebunch wheatgrass	15	
	Unfavorable	500	Arrowleaf balsamroot	10	
			Unnamed perennial forbs	10	
			Big bluestem	5	
			Columbia needlegrass	5	
			Common chokecherry	5	
			Common snowberry	5	
			Little bluestem	5	
			Sideoats grama	5	
			Oregongrape	1	
			Saskatoon serviceberry	1	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Compo-sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
255D:					
Barvon-----------	Favorable	700	Idaho fescue-----------------	25	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Bluebunch wheatgrass---------	15	
	Unfavorable	500	Arrowleaf balsamroot---------	10	
			Unnamed perennial forbs------	10	
			Big bluestem-----------------	5	
			Columbia needlegrass---------	5	
			Common chokecherry-----------	5	
			Common snowberry-------------	5	
			Little bluestem--------------	5	
			Sideoats grama---------------	5	
			Oregongrape------------------	1	
			Saskatoon serviceberry-------	1	
Cabba------------	Favorable	800	Bluebunch wheatgrass---------	25	Ponderosa pine/bluebunch wheatgrass
	Normal	700	Little bluestem--------------	20	
	Unfavorable	600	Green needlegrass------------	10	
			Needleandthread--------------	10	
			Unnamed perennial forbs------	10	
			Common chokecherry-----------	5	
			Common juniper---------------	5	
			Common snowberry-------------	5	
			Skunkbush sumac--------------	5	
			Western wheatgrass-----------	5	
256C:					
Havre------------	Favorable	2,100	Bluebunch wheatgrass---------	25	---
	Normal	1,700	Needleandthread--------------	15	
	Unfavorable	1,300	Western wheatgrass-----------	15	
			Green needlegrass------------	10	
			Canada wildrye---------------	5	
			Common snowberry-------------	5	
			Slender wheatgrass-----------	5	
			Unnamed perennial forbs------	5	
Delpoint---------	Favorable	700	Unnamed perennial forbs------	20	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Big bluestem-----------------	15	
	Unfavorable	500	Bluebunch wheatgrass---------	10	
			Green needlegrass------------	10	
			Little bluestem--------------	10	
			Common chokecherry-----------	5	
			Common snowberry-------------	5	
			Juniper----------------------	5	
			Sideoats grama---------------	5	
			Skunkbush sumac--------------	5	
			Western wheatgrass-----------	5	
280D:					
Cabbart----------	Favorable	700	Bluebunch wheatgrass---------	50	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Little bluestem--------------	10	
	Unfavorable	500	Obtuse sedge-----------------	10	
			Ponderosa pine---------------	5	
			Western wheatgrass-----------	5	
			Rocky Mountain juniper-------	2	
			Skunkbush sumac--------------	2	
			Yucca------------------------	2	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
280D: (cont.)					
Delpoint	Favorable	700	Bluebunch wheatgrass	45	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Little bluestem	10	
	Unfavorable	500	Sideoats grama	10	
			Skunkbush sumac	10	
			Unnamed perennial forbs	10	
			Plains muhly	5	
			Common snowberry	1	
			Juniper	1	
281D:					
Cabba	Favorable	800	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	700	Little bluestem	20	
	Unfavorable	600	Green needlegrass	10	
			Needleandthread	10	
			Unnamed perennial forbs	10	
			Common chokecherry	5	
			Common juniper	5	
			Common snowberry	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	
283D:					
Barvon	Favorable	700	Bluebunch wheatgrass	35	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Little bluestem	15	
	Unfavorable	500	Sideoats grama	10	
			Arrowleaf balsamroot	5	
			Idaho fescue	5	
			Unnamed perennial forbs	5	
			Skunkbush sumac	2	
			Common chokecherry	1	
Cabba	Favorable	900	Bluebunch wheatgrass	35	Ponderosa pine/bluebunch wheatgrass
	Normal	800	Little bluestem	35	
	Unfavorable	700	Unnamed perennial forbs	15	
			Green needlegrass	10	
			Needleandthread	5	
283F:					
Cabba	Favorable	900	Bluebunch wheatgrass	35	Ponderosa pine/bluebunch wheatgrass
	Normal	800	Little bluestem	35	
	Unfavorable	700	Unnamed perennial forbs	15	
			Green needlegrass	10	
			Needleandthread	5	
284D:					
Cabba	Favorable	800	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	700	Little bluestem	20	
	Unfavorable	600	Green needlegrass	10	
			Needleandthread	10	
			Unnamed perennial forbs	10	
			Common chokecherry	5	
			Common juniper	5	
			Common snowberry	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
284D:(cont.)					
Barvon-----------	Favorable	700	Idaho fescue-----------------	25	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Bluebunch wheatgrass---------	15	
	Unfavorable	500	Arrowleaf balsamroot---------	10	
			Unnamed perennial forbs------	10	
			Big bluestem-----------------	5	
			Columbia needlegrass---------	5	
			Common chokecherry-----------	5	
			Common snowberry-------------	5	
			Little bluestem--------------	5	
			Sideoats grama---------------	5	
			Oregongrape------------------	1	
			Saskatoon serviceberry-------	1	
285D:					
Cabba------------	Favorable	1,350	Bluebunch wheatgrass---------	25	Ponderosa pine/bluebunch wheatgrass
	Normal	1,100	Little bluestem--------------	20	
	Unfavorable	950	Green needlegrass------------	10	
			Needleandthread--------------	10	
			Unnamed perennial forbs------	10	
			Common chokecherry-----------	5	
			Common juniper---------------	5	
			Common snowberry-------------	5	
			Skunkbush sumac--------------	5	
			Western wheatgrass-----------	5	
285F:					
Cabba------------	Favorable	900	Bluebunch wheatgrass---------	35	Ponderosa pine/bluebunch wheatgrass
	Normal	800	Little bluestem--------------	35	
	Unfavorable	700	Unnamed perennial forbs------	15	
			Green needlegrass------------	10	
			Needleandthread--------------	5	
286F:					
Cabbart----------	Favorable	400	Bluebunch wheatgrass---------	25	Ponderosa pine/bluebunch wheatgrass
	Normal	350	Western wheatgrass-----------	25	
	Unfavorable	300	Common snowberry-------------	10	
			Mountain thermopsis----------	5	
			Wax currant------------------	2	
287D:					
Delpoint---------	Favorable	700	Bluebunch wheatgrass---------	45	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Little bluestem--------------	10	
	Unfavorable	500	Sideoats grama---------------	10	
			Skunkbush sumac--------------	10	
			Unnamed perennial forbs------	10	
			Plains muhly-----------------	5	
			Common snowberry-------------	1	
			Juniper----------------------	1	
Cabbart----------	Favorable	1,100	Bluebunch wheatgrass---------	50	Ponderosa pine/bluebunch wheatgrass
	Normal	850	Little bluestem--------------	10	
	Unfavorable	600	Obtuse sedge-----------------	10	
			Ponderosa pine---------------	5	
			Western wheatgrass-----------	5	
			Rocky Mountain juniper-------	2	
			Skunkbush sumac--------------	2	
			Yucca------------------------	2	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
287F:					
Cabbart	Favorable	400	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	350	Western wheatgrass	25	
	Unfavorable	300	Common snowberry	10	
			Mountain thermopsis	5	
			Wax currant	2	
Delpoint	Favorable	700	Bluebunch wheatgrass	45	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Little bluestem	10	
	Unfavorable	500	Sideoats grama	10	
			Skunkbush sumac	10	
			Unnamed perennial forbs	10	
			Plains muhly	5	
			Common snowberry	1	
			Juniper	1	
288D:					
Delpoint	Favorable	700	Unnamed perennial forbs	20	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Big bluestem	15	
	Unfavorable	500	Bluebunch wheatgrass	10	
			Green needlegrass	10	
			Little bluestem	10	
			Common chokecherry	5	
			Common snowberry	5	
			Juniper	5	
			Sideoats grama	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	
Cabbart	Favorable	400	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	350	Western wheatgrass	25	
	Unfavorable	300	Common snowberry	10	
			Mountain thermopsis	5	
			Wax currant	2	
Havre	Favorable	2,300	Bluebunch wheatgrass	25	---
	Normal	2,000	Needleandthread	15	
	Unfavorable	1,500	Western wheatgrass	15	
			Green needlegrass	10	
			Canada wildrye	5	
			Common snowberry	5	
			Slender wheatgrass	5	
			Unnamed perennial forbs	5	
288F:					
Cabbart	Favorable	400	Bluebunch wheatgrass	25	Ponderosa pine/bluebunch wheatgrass
	Normal	350	Western wheatgrass	25	
	Unfavorable	300	Common snowberry	10	
			Mountain thermopsis	5	
			Wax currant	2	
Delpoint	Favorable	700	Unnamed perennial forbs	20	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Big bluestem	15	
	Unfavorable	500	Bluebunch wheatgrass	10	
			Green needlegrass	10	
			Little bluestem	10	
			Common chokecherry	5	
			Common snowberry	5	
			Juniper	5	
			Sideoats grama	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	

Woodland Understory Vegetation and Habitat Types--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
289D:					
Barvon	Favorable	700	Common chokecherry	20	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Unnamed perennial forbs	15	
	Unfavorable	500	Common snowberry	10	
			Heartleaf arnica	10	
			Saskatoon serviceberry	10	
			Idaho fescue	5	
			Oregongrape	5	
			Russet buffaloberry	5	
			Bluebunch wheatgrass	1	
			Columbia needlegrass	1	
Cabba	Favorable	700	Bluebunch wheatgrass	20	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Unnamed perennial forbs	15	
	Unfavorable	500	Common snowberry	10	
			Little bluestem	10	
			Columbia needlegrass	5	
			Common chokecherry	5	
			Common juniper	5	
			Green needlegrass	5	
			Idaho fescue	5	
			Needleandthread	5	
			Oregongrape	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	
289F:					
Cabba	Favorable	700	Bluebunch wheatgrass	20	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Unnamed perennial forbs	15	
	Unfavorable	500	Common snowberry	10	
			Little bluestem	10	
			Columbia needlegrass	5	
			Common chokecherry	5	
			Common juniper	5	
			Green needlegrass	5	
			Idaho fescue	5	
			Needleandthread	5	
			Oregongrape	5	
			Skunkbush sumac	5	
			Western wheatgrass	5	
Barvon	Favorable	700	Common chokecherry	20	Ponderosa pine/bluebunch wheatgrass
	Normal	600	Unnamed perennial forbs	15	
	Unfavorable	500	Common snowberry	10	
			Heartleaf arnica	10	
			Saskatoon serviceberry	10	
			Idaho fescue	5	
			Oregongrape	5	
			Russet buffaloberry	5	
			Bluebunch wheatgrass	1	
			Columbia needlegrass	1	

Forest Land

Total acres within the survey area is approximately 1,197,184. Approximately 20 percent or about 242,405 acres of the survey area is forested. Of this amount about 83 percent (202,056 acres) is considered commercial and about 17 percent (40,349 acres) is considered non-commercial (Alexander, 1966). The commercial forest land is generally of low productivity, producing less than 50 cubic feet per acre per year (Dahms, 1964). Net volume of sawtimber within the survey area was estimated in 1989 to be approximately 379,143,000 board feet, 99 percent of which is softwood timber (Pfister and others, 1977) (Dahms, 1964). Most of the estimated timber volume is on private land (91%) (Dahms, 1964). The low productivity of the area and the small tree diameters limit the sawtimber volume available. Harvesting of the timber resource has increased over the years. Both sawtimber and pulp wood have been removed. Approximately 3,544,000 board feet of sawtimber is removed annually (Pfister and others, 1977). Of this amount about 92 percent (3,248,000 board feet) is on nonindustrial private forest land and about 8 percent (296,000 board feet) is on public ground (Pfister and others, 1977). Net annual growth of sawtimber is about 4,696,000 board feet (Myers, 1966). Interestingly, the area has an annual mortality of about 10,063,000 board feet of sawtimber (Myers, 1966).

The forest land within the survey area is protected from fire by the Department of State Lands Division of Forestry and local fire districts. The Hawk Creek Fire Burn occurred in 1985. It affected approximately 115,200 acres of the Bull Mountains in southeastern Musselshell county.

Soils vary in their ability to support the growth of trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, soils, and climate determine the kinds of trees that can be expected on any site and their growth rate. The forested soils in the soil survey area range from shallow to very deep, from nongravelly to extremely gravelly, and from fine-textured to coarse-textured. Because of differences among the soils as well as differences in climate, topography, and geology the forests vary in composition and productivity.

The major part of the coniferous forested land within the survey area occurs in the Little Snowy and Bull Mountains. The Little Snowy Mountains occur in the northwestern part of the county. Elevation ranges from about 3,000 feet to 4,900 feet. Ponderosa pine and Douglas fir are the dominant cover types there. The Bull Mountains occur in the southern part of the county. Elevation ranges from about 3,000 feet to 4,600 feet. Ponderosa pine is the dominant cover type there.

Ponderosa pine is the cover type occupying the largest acreage. Cover types of Douglas fir, plains cottonwood, and quaking aspen cover lesser acreages.

The Bull Mountains are primarily a ponderosa pine overstory. The forests are in the 10 to 14 and 15 to 19 inch precipitation zones. They are associated with the Cabbart, Delpoint, Twilight, Barvon, Cabba, Ridge, and Dast soil series. The forest understory plant community is dominated by bluebunch wheatgrasses and chokecherry habitat types.

In the Snowy Mountains there are ponderosa pine and Douglas fir overstories. These forests are mainly in the 15 to 19 and 20 to 24 inch precipitation zones. They are associated with the Hughesville, Tibs, Whitecow, and MacMeal soil series. The forest understory plant community is dominated by bluebunch wheatgrass and snowberry habitat types.

Plains cottonwood is found throughout the survey area. Dispersed stands of these cottonwoods are found along the North Willow, Fattig, Goulding, Hawk, Horsetheif, and Halfbreed creek areas. Consistent stands of plains cottonwood can be found along the Musselshell River. The plains cottonwoods is associated with the Havre, Glendive, and Korchea soil series. They are found in the 10 to 14 and 15 to 19 inch precipitation zones.

The occasionally flooded phases of Havre, Glendive, and Korchea soils are generally forested. Shrubs predominate in the understory. Rarely flooded phases of these series occasionally are forested. Trees have been cleared from much of the rarely flooded and some of the occasionally flooded alluvial soil areas.

Quaking aspen is found in random wet areas primarily in the Little Snowy Mountains. But some are found in isolated, north facing, wet areas in the 15 to 19 inch precipitation zone in the Bull Mountains. It is associated with the Barvon and Cabba soil series in the Bull Mountains. In the Snowy Mountains it is associated with the Hughesville, Tibs, and Whitecow soil series. In this survey area it is considered noncommercial forest land. These soils have moderate to high available water capacity and are located in positions that receive extra moisture as run-in. Quaking aspen is most frequently found in the 15 to 19 and 20 to 24 inch precipitation zones. The forest understory plant community is chokecherry and snowberry habitat types.

The tables "Forest Land Productivity" and "Forest Land Management" can be used by forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed.

Woodland Ordination System

The table "Forest Land Management" lists the ordination (woodland suitability) symbol for each soil. The ordination system is a nationwide uniform system of labeling soils or groups of soils that are similar in use and management. The primary factors evaluated in the woodland ordination system are productivity of the forest overstory tree species and the principal soil properties resulting in hazards and limitations that affect forest management. There are three parts of the ordination system—class, subclass, and group. The class and subclass are referred to as the ordination symbol.

Ordination Class Symbol

The first element of the ordination symbol is a number that denotes potential productivity in terms of cubic meters of wood per hectare per year for the indicator tree species. The larger the number, the greater the potential productivity. Potential productivity is based on site index and the corresponding culmination of mean annual increment. For example, the number 1 indicates a potential production of 1 cubic meter of wood per hectare per year (14.3 cubic feet per acre per year) and 10 indicates a potential production of 10 cubic meters of wood per hectare per year (143 cubic feet per acre per year).

Indicator species is a species that is common in the area and is generally, but not necessarily, the most productive on the soil. It is the species that determines the ordination class. The table "Forest Land Productivity" shows the productivity for all species where data have been collected.

Site index is determined by taking height measurements and determining the age of selected trees within stands of a given species (Alexander, 1966). This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The site indexes shown in the table "Forest Land Productivity" are averages based on measurements made at sites that are representative of the soil series. When the site index and forest land productivity of different soils are compared, the values for the same tree species should be compared (Dahms, 1964). The higher the site index number, the more productive the soil for that species. Site index values are used in conjunction with yield tables (Myers, 1966) to determine average annual yields. Indirectly, they are used to determine the productivity class in the ordination class symbol.

Ordination Subclass Symbol

The second element of the ordination symbol, or subclass, is a capital letter that indicates certain soil or physiographic characteristics that contribute to important hazards or limitations to be considered in management. The subclasses are defined as follows:

Subclass X indicates that forest land use and management are limited by stones or rocks.

Subclass W indicates that forest land use and management are significantly limited by excess water, either seasonally or throughout the year. Restricted drainage, a high water table, or flooding can adversely affect either stand development or management.

Subclass T indicates that the root zone has toxic substances. Excessive alkalinity, acidity, sodium salts, or other toxic substances impede the development of desirable species.

Subclass D indicates that forest land use and management are limited by a restricted rooting depth. The rooting depth is restricted by hard bedrock, a hardpan, or other restrictive layers in the soil.

Subclass C indicates that forest land use and management are limited by the kind or amount of clay in the upper part of the soil.

Subclass S indicates that the soil is sandy, has a low available water capacity, and normally has a low content of available plant nutrients. The use of equipment is limited during dry periods.

Subclass F indicates that forest land use and management are limited by a high content of rock fragments that are larger than 2 millimeters and smaller than 10 inches. This subclass includes flaggy soils.

Subclass R indicates that forest land use and management are limited by excessive slope.

Subclass A indicates that no significant limitations affect forest land use and management.

Forest Land Management and Productivity

Information about the productivity and management of the forested map units in the survey area is given in the tables "Forest Land Management" and "Forest Land Productivity."

Management Concerns

In the table "Forest Land Management," the soils are rated for the erosion hazard, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition.

The *erosion hazard* is *slight* if the expected soil loss is small; *moderate* if some measures are needed to control erosion during logging and road construction; and *severe* if intensive management or special equipment and methods are needed to prevent excessive soil loss.

The *equipment limitation* is *slight* if the use of equipment is not limited to a particular kind of equipment or time of year; *moderate* if there is a short seasonal limitation or a need for some modification in the management of equipment; and *severe* if there is a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings are for seedlings that are from a good planting stock and that are properly planted during a period of average rainfall. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *windthrow hazard* is *slight* if trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate* if some trees are blown down during periods of excessive soil wetness and strong winds; and *severe* if many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Plant competition is *slight* if there is little or no competition from other plants; *moderate* if plant competition is expected to hinder the development of a fully stocked stand of desirable trees; and *severe* if plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

Potential Productivity

The potential productivity of merchantable or *common trees* is expressed as a site index, which is described under the heading "Ordination Class Symbol." Commonly grown trees are those that forest land managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The column *trees that stands are commonly managed for* in the table "Forest Land Productivity" lists trees that are suitable for commercial wood production and that are suited to the soils.

Forest Access Road Limitations and Hazards

The major management concerns affecting the use of the detailed soil map units in the survey area for forest access roads are listed in the table "Main Forest Access Road Limitations and Hazards." The significance of each limitation or hazard and the criteria used to determine the limitation or hazard are described in this section.

Areas of rock outcrop and *depth to bedrock* can increase the cost of road construction and influence route planning. Constructing the roads is difficult because of the need for rock removal and for additional soil material to provide a suitable road surface.

Boulders increase the cost of road construction and influence route planning. Construction is difficult mainly because of the need for extraction and disposal of the boulders.

Dustiness of the road surface material may cause safety problems and accelerate equipment wear. Dust-abatement measures are needed during dry periods.

Flooding in the area where a road is constructed may restrict use, result in damage to the roadway, and result in the sedimentation of waterways. The hazard of flooding can be reduced by installing a drainage system, elevating the roadbed, and using riprap and diversions.

Low soil strength of the soil material used to construct the road surface can result in rutting, in drainage problems, and in poor trafficability during wet periods. The road should be used only during dry periods or when the surface is frozen. Surfacing with material of suitable strength and installing a drainage system can help to overcome this limitation.

Roadbed material that has a high *shrink-swell potential* shrinks and swells markedly during dry and wet periods. Excessive shrinking and swelling can damage the road surface or other features, such as bridge abutments, culverts, and erosion-control structures.

A steep *slope* results in increased construction and maintenance costs and increased sedimentation because of the large cuts necessary to create an adequate roadbed. Seeding the cut slope to suitable vegetation minimizes sedimentation. Large cuts can increase instability of the slope. Where slumping is a hazard, slope failure can become a significant maintenance and environmental problem. Areas where the slope is steep should not be used as sites for roads.

Slumping causes safety problems and increases maintenance costs. Frequent clearing of slumped soil in the roadbed or rebuilding of the roadway may be needed to keep the road serviceable and drainage systems functioning.

Stones cause problems in maintaining a smooth road surface that has good trafficability. Unless the stones are removed, additions of suitable stone-free material may be needed when the road is surfaced.

The erodibility of the soil material in the roadbed influences the probability of *water erosion* resulting from the channeling of runoff in the roadway. Erosion can result in the sedimentation of streams. It can be controlled by reducing road grades and controlling runoff onto and off of the road surface through the installation of drainage measures.

Roads built across soils that have a *water table* may require substantial ballast, fabric, internal drainage systems, and other measures that maintain a road surface that has good trafficability. Construction and use of the road only during periods when the water table is not near the surface or when the road is frozen help to maintain trafficability and reduce the potential for site damage.

Following is an explanation of the criteria used to determine the limitations or hazards.

Areas of rock outcrop.—Rock outcrop is a named component of the map unit.

Areas of rubble land.—Rubble land is a named component of the map unit.

Boulders.—The terms describing the texture within a depth of 24 inches include a bouldery modifier, or the soil is a bouldery phase.

Depth to rock.—Hard bedrock is within a depth of 60 inches.

Dustiness.—The surface layer is silt, silt loam, loam, or very fine sandy loam.

Flooding.—The component of the map unit is occasionally flooded or frequently flooded.

Low soil strength.—The component of the map unit has one of the following Unified classifications within the 60-inch profile: ML, CL, MH, CH, OL, PT, or GC.

Shrink-swell potential.—The component of the map unit has a high shrink-swell potential in a layer that is at least 10 inches thick and is within 40 inches of the surface.

Slope.—The upper slope limit is more than 35 percent.

Slumping.—The component of the map unit meets the requirements for low soil strength and has slopes of more than 35 percent.

Stones.—The terms describing the texture within a depth of 24 inches include a very stony or extremely stony modifier, or the soil is a very stony or extremely stony phase.

Water erosion.—The surface K factor multiplied by the upper slope limit is more than 10.

Water table.—The component of the map unit has a water table within a depth of 60 inches.

Forest Land Management

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available.)

Map symbol and soil name	Ordination symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
8B:						
Havre	5A	---	Slight	Moderate	Slight	Severe
9A:						
Havre	5A	---	Slight	Moderate	Slight	Severe
11A:						
Havre	5A	---	Slight	Moderate	Slight	Severe
232E:						
Hughesville	3F	---	Slight	Severe	Slight	Severe
Tibs	3C	---	Slight	Moderate	Slight	Moderate
Whitecow	6A	Slight	Slight	Severe	Slight	Severe
234F:						
Tibs	3C	---	Severe	Moderate	Slight	Moderate
Whitecow	6R	Moderate	Moderate	Severe	Slight	Severe
240E:						
Ridge	2D	Slight	Slight	Severe	Slight	Severe
Dast	3S	Moderate	Severe	Severe	Slight	Severe
241E:						
Twilight	2S	Moderate	Moderate	Severe	Slight	Severe
Blacksheep	1D	Moderate	Moderate	Severe	Moderate	Severe
242D:						
Dast	3S	Slight	Slight	Moderate	Slight	Severe
Ridge	3D	Slight	Slight	Severe	Slight	Severe
242F:						
Ridge	3D	Severe	Severe	Severe	Slight	Severe
Dast	3S	Moderate	Severe	Moderate	Slight	Severe
243F:						
Blacksheep	2D	Moderate	Moderate	Severe	Moderate	Severe
Twilight	2S	Moderate	Moderate	Severe	Slight	Severe
245C:						
Lamedeer	3A	---	Slight	Moderate	Slight	Severe
Ringling	2D	---	Slight	Severe	Severe	Severe
245F:						
Lamedeer	3R	---	Moderate	Moderate	Slight	Severe
Ringling	2D	---	Slight	Severe	Severe	Severe

Forest Land Management--Continued

Map symbol and soil name	Ordination symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
246F:						
Lamedeer	4R	---	Moderate	Slight	Slight	Moderate
Ringling	3D	---	Slight	Severe	Moderate	Severe
250E:						
Macmeal	3A	Moderate	Slight	Severe	Slight	Moderate
255C:						
Barvon	3A	---	Moderate	Moderate	Slight	Severe
255D:						
Barvon	3A	---	Moderate	Moderate	Slight	Severe
Cabba	3D	Slight	Slight	Severe	Slight	Severe
256C:						
Havre	5A	---	Slight	Moderate	Slight	Severe
Delpoint	3A	---	Slight	Moderate	Slight	Severe
280D:						
Cabbart	2D	Slight	Slight	Severe	Moderate	Severe
Delpoint	2A	---	Slight	Severe	Slight	Severe
281D:						
Cabba	3D	Slight	Slight	Severe	Slight	Severe
283D:						
Barvon	3A	---	Moderate	Severe	Slight	Severe
Cabba	2D	Slight	Slight	Severe	Slight	Severe
283F:						
Cabba	2D	Moderate	Moderate	Severe	Slight	Severe
284D:						
Cabba	3D	Slight	Slight	Severe	Slight	Severe
Barvon	3A	---	Moderate	Moderate	Slight	Severe
285D:						
Cabba	3D	Slight	Slight	Severe	Slight	Severe
285F:						
Cabba	2D	Moderate	Moderate	Severe	Slight	Severe
286F:						
Cabbart	2R	Severe	Severe	Moderate	Moderate	Severe
287D:						
Delpoint	2A	---	Slight	Severe	Slight	Severe
Cabbart	2D	Slight	Slight	Severe	Moderate	Severe
287F:						
Cabbart	2R	Severe	Severe	Moderate	Moderate	Severe
Delpoint	2R	---	Moderate	Severe	Slight	Severe

Forest Land Management--Continued

Map symbol and soil name	Ordination symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
288D:						
Delpoint	3A	---	Slight	Moderate	Slight	Severe
Cabbart	2D	Moderate	Moderate	Moderate	Moderate	Severe
Havre	5A	---	Slight	Moderate	Slight	Severe
288F:						
Cabbart	2R	Severe	Severe	Moderate	Moderate	Severe
Delpoint	3R	---	Moderate	Moderate	Slight	Severe
289D:						
Barvon	4A	---	Moderate	Slight	Slight	Moderate
Cabba	3D	Slight	Slight	Severe	Slight	Severe
289F:						
Cabba	3R	Severe	Severe	Severe	Slight	Severe
Barvon	4R	---	Severe	Slight	Slight	Moderate

Forest Land Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available.)

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for--
8B:						
Havre------------	Plains cottonwood-------	80	---	---	---	Plains cottonwood
9A:						
Havre------------	Plains cottonwood-------	80	---	---	---	Plains cottonwood
11A:						
Havre------------	Plains cottonwood-------	80	---	---	---	Plains cottonwood
232E:						
Hughesville------	Ponderosa pine----------	50	3	90	38	Ponderosa pine
Tibs-------------	Douglas-fir-------------	35	3	131	45	Ponderosa pine, Douglas-fir
	Ponderosa pine----------	58	3	121	44	
Whitecow---------	Ponderosa pine----------	50	3	90	38	Ponderosa pine
234F:						
Tibs-------------	Douglas-fir-------------	35	3	131	45	Ponderosa pine, Douglas-fir
	Ponderosa pine----------	58	3	121	44	
Whitecow---------	Ponderosa pine----------	50	3	90	38	Ponderosa pine
240E:						
Ridge------------	Ponderosa pine----------	43	2	67	32	Ponderosa pine
Dast-------------	Ponderosa pine----------	52	3	97	39	Ponderosa pine
241E:						
Twilight---------	Ponderosa pine----------	35	2	43	25	Ponderosa pine
Blacksheep-------	Ponderosa pine----------	35	2	43	25	Ponderosa pine
242D:						
Dast-------------	Ponderosa pine----------	62	3	138	48	Ponderosa pine
Ridge------------	Ponderosa pine----------	60	3	129	46	Ponderosa pine
242F:						
Ridge------------	Ponderosa pine----------	60	3	129	46	Ponderosa pine
Dast-------------	Ponderosa pine----------	62	3	138	48	Ponderosa pine
243F:						
Blacksheep-------	Ponderosa pine----------	35	2	43	25	Ponderosa pine
Twilight---------	Ponderosa pine----------	45	2	72	34	Ponderosa pine
245C:						
Lamedeer---------	Ponderosa pine----------	60	3	129	46	Ponderosa pine
Ringling---------	Ponderosa pine----------	40	2	60	30	Ponderosa pine
245F:						
Lamedeer---------	Ponderosa pine----------	60	3	129	46	Ponderosa pine
Ringling---------	Ponderosa pine----------	40	2	60	30	Ponderosa pine

Forest Land Productivity--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for--
246F:						
Lamedeer---------	Ponderosa pine----------	70	4	178	55	Ponderosa pine
Ringling---------	Ponderosa pine----------	50	3	90	38	Ponderosa pine
250E:						
Macmeal----------	Ponderosa pine----------	65	4	151	50	Ponderosa pine
255C:						
Barvon-----------	Ponderosa pine----------	59	3	125	45	Ponderosa pine
255D:						
Barvon-----------	Ponderosa pine----------	59	3	125	45	Ponderosa pine
Cabba------------	Ponderosa pine----------	52	3	97	39	Ponderosa pine
256C:						
Havre------------	Plains cottonwood-------	80	---	---	---	Plains cottonwood
Delpoint---------	Ponderosa pine----------	55	3	108	42	Ponderosa pine
280D:						
Cabbart----------	Ponderosa pine----------	35	2	43	25	Ponderosa pine
Delpoint---------	Ponderosa pine----------	48	2	83	36	Ponderosa pine
281D:						
Cabba------------	Ponderosa pine----------	52	3	97	39	Ponderosa pine
283D:						
Barvon-----------	Ponderosa pine----------	50	3	90	38	Ponderosa pine
Cabba------------	Ponderosa pine----------	45	2	72	34	Ponderosa pine
283F:						
Cabba------------	Ponderosa pine----------	45	2	72	34	Ponderosa pine
284D:						
Cabba------------	Ponderosa pine----------	52	3	97	39	Ponderosa pine
Barvon-----------	Ponderosa pine----------	59	3	125	45	Ponderosa pine
285D:						
Cabba------------	Ponderosa pine----------	52	3	97	39	Ponderosa pine
285F:						
Cabba------------	Ponderosa pine----------	45	2	72	34	Ponderosa pine
286F:						
Cabbart----------	Ponderosa pine----------	40	2	60	30	Ponderosa pine
287D:						
Delpoint---------	Ponderosa pine----------	48	2	83	36	Ponderosa pine
Cabbart----------	Ponderosa pine----------	35	2	43	25	Ponderosa pine
287F:						
Cabbart----------	Ponderosa pine----------	40	2	60	30	Ponderosa pine
Delpoint---------	Ponderosa pine----------	48	2	83	36	Ponderosa pine

Forest Land Productivity--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for--
288D:						
Delpoint	Ponderosa pine	55	3	108	42	Ponderosa pine
Cabbart	Ponderosa pine	40	2	60	30	Ponderosa pine
Havre	Plains cottonwood	80	---	---	---	Plains cottonwood
288F:						
Cabbart	Ponderosa pine	40	2	60	30	Ponderosa pine
Delpoint	Ponderosa pine	55	3	108	42	Ponderosa pine
289D:						
Barvon	Ponderosa pine	70	4	178	55	Ponderosa pine
Cabba	Ponderosa pine	62	3	138	48	Ponderosa pine
289F:						
Cabba	Ponderosa pine	62	3	138	48	Ponderosa pine
Barvon	Ponderosa pine	70	4	178	55	Ponderosa pine

Main Forest Access Road Limitation and Hazards

(See text for a description of the limitations and hazards listed in this table.)

Soil name and map symbol	Forest access road limitations or hazards
8B:	
Harlake	Low soil strength Shrink swell potential
Havre	Low soil strength
9A:	
Havre	Low soil strength
11A:	
Havre	Low soil strength
Glendive	Low soil strength
232E:	
Hughesville	Depth to rock Low soil strength
Tibs	Low soil strength Shrink swell potential
Whitecow	Low soil strength
234F:	
Tibs	Low soil strength Shrink swell potential Slope Water erosion
Whitecow	Low soil strength Slope Water erosion
240E:	
Ridge	Areas of rock outcrop Low soil strength
Dast	Areas of rock outcrop Low soil strength
Rock outcrop	Nonsoil material
241E:	
Twilight	Areas of rock outcrop
Blacksheep	Areas of rock outcrop Low soil strength
Rock outcrop	Nonsoil material
242D:	
Dast	Low soil strength
Ridge	Low soil strength
242F:	
Ridge	Low soil strength Slope

Main Forest Access Road Limitation and Hazards--Continued

Soil name and map symbol	Forest access road limitations or hazards
243F:	
Blacksheep	Low soil strength Slope
Twilight	None
245C:	
Lamedeer	Low soil strength
Ringling	None
245F:	
Lamedeer	Low soil strength Slope
Ringling	Slope
246F:	
Lamedeer	Low soil strength Slope
Ringling	Slope
250E:	
Macmeal	Areas of rock outcrop Low soil strength
Rock outcrop	Nonsoil material
255C:	
Shambo	Low soil strength
Korchea	Low soil strength
Barvon	Low soil strength
255D:	
Barvon	Low soil strength
Cabba	Low soil strength
Shambo	Low soil strength
256C:	
Yamacall	Low soil strength
Havre	Low soil strength
Delpoint	Low soil strength
280D:	
Cabbart	Low soil strength
Delpoint	Low soil strength
281D:	
Doney	Low soil strength
Cabba	Low soil strength
Macar	Low soil strength

Main Forest Access Road Limitation and Hazards--Continued

Soil name and map symbol	Forest access road limitations or hazards
283D:	
Barvon	Low soil strength
Cabba	Low soil strength
283F:	
Cabba	Areas of rock outcrop Low soil strength Slope Water erosion
Rock outcrop	Nonsoil material
284D:	
Cabba	Low soil strength
Barvon	Low soil strength
285D:	
Cabba	Low soil strength
Doney	Low soil strength
285F:	
Cabba	Low soil strength Slope Water erosion
Doney	Low soil strength Water erosion
286F:	
Cabbart	Areas of rock outcrop Low soil strength Slope Water erosion
Rock outcrop	Nonsoil material
287D:	
Delpoint	Low soil strength
Cabbart	Low soil strength
287F:	
Cabbart	Low soil strength Slope Water erosion
Delpoint	Low soil strength Water erosion
288D:	
Delpoint	Low soil strength
Cabbart	Low soil strength
Havre	Low soil strength

Main Forest Access Road Limitation and Hazards--Continued

Soil name and map symbol	Forest access road limitations or hazards
288F:	
Cabbart	Low soil strength Slope Water erosion
Delpoint	Low soil strength Water erosion
289D:	
Barvon	Low soil strength
Cabba	Low soil strength
Korchea	Low soil strength
289F:	
Cabba	Low soil strength Slope Water erosion
Barvon	Low soil strength Water erosion

Recreation

The soils of the survey area are rated in the table "Recreational Development" according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites, and either access to public sewer lines or the capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degrees, for recreational uses by the duration of flooding and the season when it occurs. Onsite assessment of the height, duration, intensity, and frequency of flooding is essential in planning recreational facilities.

Camp areas are tracts of land used intensively as sites for tents, trailers, and campers and for outdoor activities that accompany such sites. These areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soils are rated on the basis of soil properties that influence the ease of developing camp areas and performance of the areas after development. Also considered are the soil properties that influence trafficability and promote the growth of vegetation after heavy use.

Picnic areas are natural or landscaped tracts of land that are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation after development. The surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Playgrounds are areas used intensively for baseball, football, or similar activities. These areas require a nearly level soil that is free of stones and that can withstand heavy foot traffic and maintain an adequate cover of vegetation. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation. Slope and stoniness are the main concerns in developing playgrounds. The surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Paths and trails are areas used for hiking and horseback riding. The areas should require little or no cutting and filling during site preparation. The soils are rated on the basis of soil properties that influence trafficability and erodibility. Paths and trails should remain firm under foot traffic and not be dusty when dry.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

The interpretive ratings in this table help engineers, planners, and others to understand how soil properties influence recreational uses. Ratings for proposed uses are given in terms of limitations. Only the most restrictive features are listed. Other features may limit a specific recreational use.

The degree of soil limitation is expressed as slight, moderate, or severe.

Slight means that soil properties are favorable for the rated use. The limitations are minor and can be easily overcome. Good performance and low maintenance are expected.

Moderate means that soil properties are moderately favorable for the rated use. The limitations can be overcome or modified by special planning, design, or maintenance. During some part of the year, the expected performance may be less desirable than that of soils rated *slight*.

Severe means that soil properties are unfavorable for the rated use. Examples of limitations are slope, bedrock near the surface, flooding, and a seasonal high water table. These limitations generally require major soil reclamation, special design, or intensive maintenance. Overcoming the limitations generally is difficult and costly.

The information in the table "Recreational Development" can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in the table "Building Site Development" and interpretations for septic tank absorption fields in the table "Sanitary Facilities."

Recreational Development

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1E:					
Badland.					
2E:					
Rock outcrop.					
3A:					
Riverwash.					
5A:					
Harlake---------	Severe: flooding	Moderate: too clayey	Moderate: too clayey	Moderate: too clayey	Severe: too clayey
6A:					
Harlake---------	Severe: flooding	Moderate: too clayey	Moderate: too clayey, flooding	Moderate: too clayey	Severe: too clayey
7A:					
Lostriver-------	Severe: flooding	Moderate: too clayey, excess salt	Moderate: too clayey, excess salt	Moderate: too clayey	Severe: too clayey
7B:					
Lostriver-------	Severe: flooding	Moderate: too clayey, excess salt	Moderate: too clayey, excess salt	Moderate: too clayey	Severe: too clayey
Bullhook--------	Severe: flooding	Moderate: excess salt, dusty	Moderate: dusty, excess salt	Moderate: dusty	Moderate: excess salt
8A:					
Harlake---------	Severe: flooding	Moderate: too clayey	Moderate: too clayey, flooding	Moderate: too clayey	Severe: too clayey
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
8B:					
Harlake---------	Severe: flooding	Moderate: too clayey	Moderate: too clayey	Moderate: too clayey	Severe: too clayey
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
9A:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
9B:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
9B: (cont.)					
Yamacall--------	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
10A:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
11A:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
Glendive--------	Severe: flooding	Slight	Slight	Slight	Slight
11B:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
Glendive--------	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
12A:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
Harlake---------	Severe: flooding	Moderate: too clayey	Moderate: too clayey, flooding	Moderate: too clayey	Severe: too clayey
13A:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
14A:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
Glendive--------	Severe: flooding	Slight	Slight	Slight	Slight
14B:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
Glendive--------	Severe: flooding	Slight	Moderate: flooding	Slight	Moderate: flooding
15A:					
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
Harlake---------	Severe: flooding	Moderate: too clayey	Moderate: too clayey	Moderate: too clayey	Severe: too clayey

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
16A:					
Havre	Severe: flooding	Moderate: dusty	Moderate: flooding, dusty	Moderate: dusty	Moderate: flooding
Yamacall	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
17A:					
Harlake	Severe: flooding	Moderate: too clayey	Moderate: too clayey	Moderate: too clayey	Severe: too clayey
Havre	Severe: flooding	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
20B:					
Harlake	Severe: flooding	Moderate: too clayey	Moderate: too clayey, flooding	Moderate: too clayey	Severe: too clayey
Marvan	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
Vanda	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
21A:					
McKenzie	Severe: wetness, percs slowly, too clayey	Severe: too clayey, percs slowly	Severe: too clayey, wetness, percs slowly	Severe: too clayey	Severe: too clayey
22B:					
Nobe	Moderate: wetness, percs slowly, excess salt	Moderate: wetness, excess salt, percs slowly	Moderate: slope, wetness, percs slowly	Slight	Moderate: excess salt, droughty
Absher	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Moderate: too clayey	Severe: excess sodium, too clayey
23A:					
Gerdrum	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Vanda	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
23B:					
Gerdrum	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Vanda	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
23B: (cont.)					
Creed-----------	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
23C:					
Gerdrum---------	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Creed-----------	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
25A:					
Vanda-----------	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
26A:					
Weingart--------	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
26B:					
Weingart--------	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Warhorse--------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Severe: depth to rock
30C:					
Busby-----------	Slight	Slight	Moderate: slope	Slight	Slight
30D:					
Busby-----------	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
31B:					
Delpoint--------	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
31C:					
Delpoint--------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Yamacall--------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope
32B:					
Twilight--------	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
32D:					
Twilight--------	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
32D: (cont.)					
Blacksheep------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Slight	Severe: depth to rock
Rock outcrop.					
33A:					
Yamacall--------	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight
33B:					
Yamacall--------	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
34A:					
Yamacall--------	Slight	Slight	Moderate: small stones	Slight	Slight
34B:					
Yamacall--------	Slight	Slight	Moderate: slope, small stones	Slight	Slight
35B:					
Yamacall--------	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
Busby-----------	Slight	Slight	Moderate: slope	Slight	Slight
36B:					
Yamacall--------	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
Delpoint--------	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
37A:					
Yamacall--------	Slight	Slight	Moderate: small stones	Slight	Slight
37B:					
Yamacall--------	Slight	Slight	Moderate: slope, small stones	Slight	Slight
38A:					
Kobase----------	Slight	Slight	Moderate: slope	Slight	Slight
Zatoville-------	Slight	Slight	Moderate: slope	Slight	Slight

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
38B:					
Zatoville	Slight	Slight	Moderate: slope	Slight	Slight
39B:					
Delpoint	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
39C:					
Delpoint	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Yamacall	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope
40B:					
Kobase	Slight	Slight	Moderate: slope	Slight	Slight
40C:					
Kobase	Slight	Slight	Moderate: slope	Slight	Slight
41A:					
Yamacall	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight
41B:					
Yamacall	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
41C:					
Yamacall	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
Delpoint	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
50B:					
Hinterland	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Severe: depth to rock
50C:					
Hinterland	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
50D:					
Hinterland------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Delplain--------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Moderate: slope	Severe: slope, depth to rock
51A:					
Ethridge--------	Slight	Slight	Slight	Slight	Slight
51B:					
Ethridge--------	Slight	Slight	Moderate: slope	Slight	Slight
52A:					
Eapa------------	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight
52B:					
Eapa------------	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
53A:					
Tanna-----------	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
54A:					
Marmarth--------	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
56A:					
Crago-----------	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: droughty
Musselshell-----	Slight	Slight	Moderate: small stones	Slight	Moderate: large stones
Attewan---------	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Moderate: droughty
57A:					
Attewan---------	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Moderate: droughty
57B:					
Attewan---------	Moderate: large stones, small stones, dusty	Moderate: large stones, small stones, dusty	Severe: large stones, small stones	Moderate: dusty	Moderate: small stones, large stones, droughty

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
57C:					
Attewan	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Moderate: droughty
Niart	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
58A:					
Verson	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: droughty
60B:					
Abor	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, depth to rock	Moderate: too clayey	Severe: too clayey
60C:					
Abor	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, depth to rock	Moderate: too clayey	Severe: too clayey
Neldore	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
60D:					
Neldore	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
Abor	Moderate: slope, percs slowly, too clayey	Moderate: slope, too clayey, percs slowly	Severe: slope	Severe: erodes easily	Severe: too clayey
60E:					
Neldore	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, too clayey, depth to rock.
Abor	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope, too clayey.
61D:					
Neldore	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
Neldore, saline	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
61E:					
Neldore	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
61E: (cont.)					
Volborg---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
62C:					
Neldore---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
62D:					
Neldore---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
Yawdim----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: too clayey	Severe: depth to rock, too clayey
62E:					
Neldore---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock, too clayey
Rock outcrop.					
63A:					
Marias----------	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
64A:					
Marvan----------	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
Vanda-----------	Moderate: percs slowly, too clayey, excess salt	Moderate: too clayey, excess salt, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
64B:					
Marvan----------	Moderate: percs slowly, too clayey	Moderate: too clayey, percs slowly	Moderate: slope, too clayey, percs slowly	Moderate: too clayey	Severe: too clayey
67D:					
Yawdim----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
68C:					
Megonot---------	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Yawdim----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
69C:					
Orinoco	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock
Yawdim	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
73D:					
Yawdim	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Abor	Moderate: slope, percs slowly, too clayey	Moderate: slope, too clayey, percs slowly	Severe: slope	Severe: erodes easily	Severe: too clayey
73E:					
Yawdim	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock, too clayey
Abor	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope, too clayey
74D:					
Abor	Moderate: slope, percs slowly, too clayey	Moderate: slope, too clayey, percs slowly	Severe: slope	Severe: erodes easily	Severe: too clayey
Crago	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Severe: droughty
74E:					
Abor	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope, too clayey
Crago	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
80E:					
Blacksheep	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Rock outcrop.					
Twilight	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: droughty, slope, depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
81B:					
Delpoint	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Moderate: dusty	Severe: depth to rock
81C:					
Delpoint	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
81D:					
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
82B:					
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Delpoint	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
82C:					
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Delpoint	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Rock outcrop.					
82E:					
Cabbart	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Delpoint	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Rock outcrop.					
83D:					
Cabbart	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Rock outcrop.					

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
83D:(cont.)					
Blacksheep------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
84C:					
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Yawdim----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Delpoint--------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
84D:					
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Yawdim----------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Rock outcrop.					
84E:					
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Yawdim----------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Delpoint--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
85A:					
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Severe: depth to rock
86D:					
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Rentsac---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Slight	Severe: depth to rock
86E:					
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Rock outcrop.					

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
87B:					
Delpoint--------	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Moderate: dusty	Severe: depth to rock
88D:					
Delpoint--------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Rock outcrop.					
89C:					
Rentsac---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Severe: depth to rock
90B:					
Chinook---------	Slight	Slight	Moderate: slope, small stones	Slight	Slight
91A:					
Kremlin---------	Moderate: dusty	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
91B:					
Kremlin---------	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
92A:					
Binna-----------	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Moderate: droughty
93A:					
Crago-----------	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: droughty
Musselshell-----	Slight	Slight	Moderate: slope, small stones	Slight	Moderate: large stones
93B:					
Crago-----------	Moderate: large stones, small stones	Moderate: large stones, small stones	Severe: large stones, small stones	Moderate: large stones	Severe: droughty
94A:					
Crago-----------	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: droughty
94E:					
Crago-----------	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
95A:					
Crago	Moderate: large stones, small stones	Moderate: large stones, small stones	Severe: large stones, small stones	Slight	Severe: droughty
Musselshell	Moderate: large stones	Moderate: large stones	Severe: large stones	Moderate: large stones	Severe: large stones
95B:					
Crago	Moderate: large stones, small stones	Moderate: large stones, small stones	Severe: large stones, small stones	Slight	Severe: droughty
Attewan	Moderate: large stones, small stones, dusty	Moderate: large stones, small stones, dusty	Severe: large stones, small stones	Moderate: dusty	Moderate: small stones, large stones, droughty
Musselshell	Moderate: large stones	Moderate: large stones	Severe: large stones	Moderate: large stones	Severe: large stones
95C:					
Crago	Moderate: large stones, small stones	Moderate: large stones, small stones	Severe: large stones, small stones	Moderate: large stones	Severe: droughty
Attewan	Moderate: large stones, small stones, dusty	Moderate: large stones, small stones, dusty	Severe: large stones, small stones	Moderate: dusty	Moderate: small stones, large stones, droughty
95E:					
Yawdim	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Crago	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope
96E:					
Crago	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope
Abor	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope, too clayey
97A:					
Musselshell	Moderate: large stones	Moderate: large stones	Severe: large stones	Moderate: large stones	Severe: large stones
Crago	Moderate: large stones, small stones	Moderate: large stones, small stones	Severe: large stones, small stones	Slight	Moderate: small stones, large stones, droughty
97B:					
Musselshell	Slight	Slight	Severe: slope	Slight	Moderate: large stones

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
97B: (cont.)					
Crago	Moderate: small stones	Moderate: small stones	Severe: slope, small stones	Slight	Severe: droughty
98A:					
Niart	Moderate: large stones, small stones, dusty	Moderate: large stones, small stones, dusty	Severe: large stones, small stones	Moderate: dusty	Moderate: small stones, large stones
98B:					
Niart	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Crago	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: droughty
98C:					
Niart	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope
Crago	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Severe: droughty
98D:					
Niart	Moderate: dusty	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Rothiemay	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
123C:					
Creed	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
Gerdrum	Severe: excess sodium	Severe: excess sodium	Severe: excess sodium	Slight	Severe: excess sodium
130B:					
Busby	Slight	Slight	Moderate: slope.	Slight	Slight
Twilight	Slight	Slight	Moderate: slope.	Slight	Moderate: depth to rock
131C:					
Delpoint	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
Yamacall	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
132B:					
Twilight--------	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
Blacksheep------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Severe: depth to rock
138B:					
Zatoville-------	Slight	Slight	Moderate: slope	Slight	Slight
Orinoco---------	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
140B:					
Kobase----------	Slight	Slight	Moderate: slope	Slight	Slight
Megonot---------	Slight	Slight	Moderate: slope, small stones, depth to rock	Slight	Moderate: depth to rock
140C:					
Kobase----------	Slight	Slight	Moderate: slope	Slight	Slight
Megonot---------	Slight	Slight	Moderate: slope, small stones, depth to rock	Slight	Moderate: depth to rock
142A:					
Rothiemay-------	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight
142B:					
Rothiemay-------	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
142C:					
Rothiemay-------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope
Crago-----------	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Severe: droughty
152A:					
Eapa------------	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Slight
Attewan---------	Moderate: dusty	Moderate: dusty	Moderate: small stones, dusty	Moderate: dusty	Moderate: droughty

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
153C:					
Tanna-----------	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Moderate: dusty	Severe: depth to rock
153D:					
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Tanna-----------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
154C:					
Marmarth--------	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Moderate: dusty	Severe: depth to rock
154D:					
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Marmarth--------	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock
158A:					
Ethridge--------	Slight	Slight	Slight	Slight	Slight
Verson----------	Slight	Slight	Moderate: small stones	Slight	Moderate: droughty
167D:					
Yawdim----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Orinoco---------	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock
167E:					
Yawdim----------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Orinoco---------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
181D:					
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
181D: (cont.)					
Crago-----------	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Severe: droughty
Delpoint--------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
181E:					
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Crago-----------	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
Delpoint--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
189C:					
Rentsac---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Slight	Severe: depth to rock
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
189E:					
Rentsac---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Rock outcrop.					
230C:					
Macar-----------	Slight	Slight	Moderate: slope	Slight	Slight
232E:					
Hughesville-----	Severe: large stones	Severe: large stones	Severe: large stones, slope, small stones	Moderate: large stones	Severe: large stones
Tibs------------	Moderate: slope, large stones	Moderate: slope, large stones	Severe: large stones, slope	Moderate: large stones	Severe: large stones
Whitecow--------	Moderate: slope, large stones, small stones	Moderate: slope, large stones, small stones	Severe: large stones, slope, small stones	Moderate: large stones	Moderate: small stones, large stones, droughty
234F:					
Tibs------------	Severe: slope	Severe: slope	Severe: large stones, slope	Severe: slope	Severe: large stones, slope

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
234F: (cont.)					
Whitecow--------	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: slope
240E:					
Ridge-----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Slight	Severe: depth to rock
Dast------------	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Rock outcrop.					
241E:					
Twilight--------	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock
Blacksheep------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Rock outcrop.					
242D:					
Dast------------	Slight	Slight	Moderate: slope, small stones, depth to rock	Slight	Moderate: depth to rock
Ridge-----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Slight	Severe: depth to rock
242F:					
Ridge-----------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Dast------------	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
243F:					
Blacksheep------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope	Severe: slope, depth to rock
Twilight--------	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
245C:					
Lamedeer--------	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, droughty
Ringling--------	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: droughty

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
245F:					
Lamedeer--------	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Ringling--------	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope
246F:					
Lamedeer--------	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Ringling--------	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope
250E:					
Macmeal---------	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Rock outcrop.					
251C:					
Savage----------	Slight	Slight	Moderate: slope	Slight	Slight
252D:					
Hilger----------	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: large stones, slope	Severe: slope
Rock outcrop.					
252E:					
Hilger----------	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Moderate: small stones, large stones, droughty
254C:					
Fergus----------	Slight	Slight	Moderate: slope, small stones	Slight	Slight
255C:					
Shambo----------	Slight	Slight	Moderate: slope	Slight	Slight
Korchea---------	Severe: flooding	Slight	Moderate: slope	Slight	Slight
Barvon----------	Slight	Slight	Severe: slope	Slight	Moderate: depth to rock
255D:					
Barvon----------	Slight	Slight	Severe: slope	Slight	Moderate: depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
255D: (cont.)					
Cabba	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Shambo	Slight	Slight	Severe: slope	Slight	Slight
256C:					
Yamacall	Moderate: dusty	Moderate: dusty	Moderate: slope, small stones, dusty	Moderate: dusty	Slight
Havre	Severe: flooding	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight
Delpoint	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Moderate: depth to rock
260F:					
Kuro	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Wayden	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Rock outcrop.					
261F:					
Wayden	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Castner	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Moderate: slope	Severe: slope, depth to rock
262E:					
Wayden	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Windham	Moderate: small stones	Moderate: small stones	Severe: slope, small stones	Slight	Moderate: small stones, large stones, droughty
280D:					
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Delpoint	Moderate: dusty	Moderate: dusty	Severe: slope	Moderate: dusty	Moderate: depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
280E:					
Castner---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, small stones, depth to rock	Slight	Severe: depth to rock
Kuro------------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
281D:					
Doney-----------	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Cabba-----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Macar-----------	Slight	Slight	Severe: slope	Slight	Slight
281E:					
Castner---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope	Severe: slope, depth to rock
Rock outcrop.					
282D:					
Castner---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, small stones, depth to rock	Slight	Severe: depth to rock
283D:					
Barvon----------	Slight	Slight	Moderate: slope, depth to rock	Slight	Moderate: depth to rock
Cabba-----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Slight	Severe: depth to rock
283F:					
Cabba-----------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Rock outcrop.					
284D:					
Cabba-----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Barvon----------	Slight	Slight	Severe: slope	Slight	Moderate: depth to rock
284F:					
Doney-----------	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
284F: (cont.)					
Wayden----------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
285D:					
Cabba-----------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: depth to rock
Doney-----------	Slight	Slight	Severe: slope	Slight	Moderate: depth to rock
285F:					
Cabba-----------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Doney-----------	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
286F:					
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Rock outcrop.					
287D:					
Delpoint--------	Moderate: dusty	Moderate: dusty	Moderate: slope, depth to rock, dusty	Moderate: dusty	Moderate: depth to rock
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Moderate: dusty	Severe: depth to rock
287F:					
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Delpoint--------	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
288D:					
Delpoint--------	Moderate: slope, dusty	Moderate: slope, dusty	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Cabbart---------	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Havre-----------	Severe: flooding	Moderate: dusty	Moderate: slope, dusty	Moderate: dusty	Slight

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
288F:					
Cabbart	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Delpoint	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
289D:					
Barvon	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
Cabba	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: erodes easily	Severe: slope, depth to rock
Korchea	Severe: flooding	Slight	Moderate: slope	Slight	Slight
289F:					
Cabba	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, erodes easily	Severe: slope, depth to rock
Barvon	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
291C:					
Windham	Severe: small stones	Severe: small stones	Severe: large stones, slope, small stones	Slight	Severe: small stones
292A:					
Straw	Severe: flooding	Slight	Moderate: small stones	Slight	Slight
Korchea	Severe: flooding	Slight	Slight	Slight	Slight
294C:					
Shambo	Slight	Slight	Moderate: slope	Slight	Slight
295F:					
Bitton	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Winifred	Severe: slope	Severe: slope	Severe: slope	Severe: slope, erodes easily	Severe: slope
Castner	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope	Severe: slope, depth to rock

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
296D:					
Borky-----------	Severe: small stones	Severe: small stones	Severe: large stones, slope, small stones	Moderate: large stones	Severe: small stones, large stones
Sinnigam--------	Severe: depth to rock	Severe: depth to rock	Severe: large stones, slope, small stones	Moderate: large stones	Severe: large stones, depth to rock

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. If food, cover, or water is missing, inadequate, or inaccessible, wildlife will be scarce or will not inhabit the area.

If the soils have potential for habitat development, wildlife habitat can be created or improved by planting appropriate vegetation, properly managing the existing plant cover, and fostering the natural establishment of desirable plants.

Elements of Wildlife Habitat

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants used by wildlife. Examples are wheat, rye, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes planted for wildlife food and cover. Examples are fescue, bromegrass, timothy, orchardgrass, clover, alfalfa, trefoil, reed canarygrass, and crownvetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, indiangrass, blueberry, goldenrod, lambsquarters, dandelions, blackberry, ragweed, wheatgrass, fescue, and nightshade.

The major soil properties affecting the growth of grain and forage crops and wild herbaceous plants are depth of the root zone, texture of the surface layer, the amount of water available to plants, wetness, salinity or sodicity, and flooding. The length of the growing season also is important.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage that wildlife eat. Examples are oak, poplar, boxelder, birch, maple, green ash, willow, and American elm. Examples of fruit-producing shrubs that are suitable for planting on soils that have good potential for these plants are hawthorn, honeysuckle, American plum, redosier dogwood, chokecherry, serviceberry, silver buffaloberry, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover that provides habitat or supplies food in the form of browse, seed, or fruitlike cones. Examples are pine, spruce, hemlock, fir, yew, cedar, larch, and juniper.

The major soil properties affecting the growth of hardwood and coniferous trees and shrubs are depth of the root zone, the amount of water available to plants, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Wetland plants produce food or cover for wetland wildlife. Examples of these plants are smartweed, wild millet, rushes, sedges, bulrushes, wild rice, arrowhead, waterplantain, pickerelweed, and cattail.

The major soil properties affecting wetland plants are texture of the surface layer, wetness, acidity or alkalinity, and slope.

Shallow water areas have an average depth of less than 5 feet. They are useful as habitat for some wildlife species. They are naturally wet areas or are created by dams, levees, or water-control measures in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

The major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability.

Kinds of Wildlife Habitat

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, and shrubs. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include Hungarian partridge, pheasant, sharp-tailed grouse, sage grouse, meadowlark, field sparrow, killdeer, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of hardwoods or conifers or a mixture of these and associated grasses, legumes, and wild herbaceous plants. The wildlife attracted to this habitat include wild turkey, ruffed grouse, thrushes, woodpeckers, owls, tree squirrels, porcupine, raccoon, deer, elk, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas that support water-tolerant plants. The wildlife attracted to this habitat include ducks, geese, herons, bitterns, rails, kingfishers, muskrat, otter, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. The wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Wildlife of Musselshell County

Musselshell County offers considerable diversity of habitats for wildlife management. Mountain foothills, forested hills, grazeable woodland, rangeland, cropland, riparian areas, streams and rivers, ponds, and reservoirs are available to landowners and managers to use in the development of high quality wildlife habitats.

Rocky Mountain elk occur in limited numbers in the northwest corner of the county in the Little Snowy Mountains and in greater numbers in the southern half of the county in the Bull Mountains.

Both white-tailed and mule deer occur throughout the survey area. Whitetail's inhabit the flood plains and valleys of the Musselshell River and its associated tributaries. Mule deer occur throughout much of the county.

Pronghorn's primarily occupy the open rangeland and unirrigated cropland in the northern half of the county. However, antelope habitat does occasionally include grazeable woodland areas south of the Musselshell River.

Black bear and mountain lion occupy the forests of the Little Snowy Mountains, which includes the very northwest corner of the survey area. There are also mountain lion present in the Bull Mountain region of Musselshell County, but in very limited numbers.

The Musselshell River flood plain is the primary habitat for ring-necked pheasants in the form of irrigated and dry cropland, brushy thickets, ditch banks, and fence rows. Grain fields, shelterbelts, and brushy drainageways provide good habitat in the uplands and foothills.

Merriam's turkeys occur in the Bull Mountain region of the county, and in the far northwest corner. Turkeys are associated with ponderosa pine/grassland habitats, as well as riparian (stream bottom) areas.

Sage grouse occur on sagebrush covered rangelands in the northern half of the county. Optimum sage grouse habitat is characterized by plant communities with big sagebrush, silver sagebrush, and a variety of forbs and grasses.

Sharp-tailed grouse and gray partridge occur throughout the prairie uplands of the survey area where grain fields and brushy cover, with an abundance of fruit-bearing shrubs including chokecherry, plum, rose, snowberry, and buffaloberry, provide excellent habitat. Within these areas, grain fields, shelterbelts, windbreaks, brushy draws, and an intermix of shrubs, forbs, and grasses provide suitable habitat for these prairie species.

Migratory waterfowl use the Musselshell River, Lake Mason Wildlife Refuge and ponds, reservoirs, marshes, and closed depressions throughout the survey area from spring through fall. These birds use riverine habitat for nesting, feeding, and loafing.

Beaver, mink, and muskrat occur throughout the principle watercourses, while badgers, ground squirrels, coyotes, bobcats, and a variety of small mammals occur throughout the survey area.

Engineering

This section provides information for planning land uses related to urban development and water management. Soils are rated for various uses and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, site selection, and design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

The table "Building Site Development" shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, potential for frost action, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

The table "Sanitary Facilities" shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. It also shows the suitability of the soils for use as a daily cover for landfill.

Soil properties are important in selecting sites for sanitary facilities and in identifying limiting soil properties and site features to be considered in planning, design, and installation. Soil limitation ratings of *slight, moderate,* or *severe* are given for septic tank absorption fields, sewage lagoons, and trench and area sanitary landfills. Soil suitability ratings of *good, fair,* and *poor* are given for daily cover for landfill.

A rating of *slight* or *good* indicates that the soils have no limitations or that the limitations can be easily overcome. Good performance and low maintenance can be expected. A rating of *moderate* or *fair* indicates that the limitations should be recognized but generally can be overcome by good management or special design. A rating of *severe* or *poor* indicates that overcoming the limitations is difficult or impractical. Increased maintenance may be required.

Septic tank absorption fields are areas in which subsurface systems of tile or perforated pipe distribute effluent from a septic tank into the natural soil. The centerline of the tile is assumed to be at a depth of 24 inches. Only the part of the soil between depths of 24 and 60 inches is considered in making the ratings. The soil properties and site features considered are those that affect the absorption of the effluent, those that affect the construction and maintenance of the system, and those that may affect public health.

The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted, relatively impervious soil material. Aerobic lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Relatively impervious soil material for the lagoon floor and sides is desirable to minimize seepage and contamination of local ground water.

The table "Sanitary Facilities" gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Trench sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil that is excavated from the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. Soil properties that influence the risk of pollution, the ease of excavation, trafficability, and revegetation are the major considerations in rating the soils.

Area sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil that is imported from a source away from the site. A final cover of soil at least 2 feet thick is placed over the completed landfill. Soil properties that influence trafficability, revegetation, and the risk of pollution are the main considerations in rating the soils for area sanitary landfills.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of groundwater pollution. The ratings in the table "Sanitary Facilities" are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The suitability of a soil for use as cover is based on properties that affect workability and the ease of digging, moving, and spreading the material over the refuse daily during both wet and dry periods.

Soil texture, wetness, rock fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Waste Management

Soil properties are important when organic waste is applied as fertilizer and wastewater is applied in irrigated areas. They also are important when the soil is used as a medium for the treatment and disposal of the organic waste and wastewater. Unfavorable soil properties can result in environmental damage.

The use of organic waste and wastewater as production resources results in energy and resource conservation and minimizes the problems associated with waste disposal. If disposal is the goal, applying a maximum amount of the organic waste or the wastewater to a minimal area holds costs to a minimum and environmental damage is the main hazard. If reuse is the goal, a minimum amount should be applied to a maximum area and environmental damage is unlikely.

Interpretations developed for waste management may include ratings for manure- and food-processing waste, municipal sewage sludge, use of wastewater for irrigation, and treatment of wastewater by slow rate, overland flow, and rapid infiltration processes.

Specific information regarding waste management is available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Construction Materials

The table "Construction Materials" gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In the table "Construction Materials," the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have one or more of the following characteristics: a plasticity index of more than 10, a high shrink-swell potential, many stones, slopes of more than 25 percent, or a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table "Construction Materials," only the probability of finding material in suitable quantity in or below the soil is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

The table "Water Management" gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and severe if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In the table "Water Management," the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Building Site Development

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1E: Badland.						
2E: Rock outcrop.						
3A: Riverwash.						
5A: Harlake	Moderate: too clayey	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
6A: Harlake	Moderate: too clayey, flooding	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength, flooding	Severe: too clayey
7A: Lostriver	Moderate: too clayey	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
7B: Lostriver	Moderate: too clayey	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
Bullhook	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: shrink-swell, flooding, frost action	Moderate: excess salt
8A: Harlake	Moderate: too clayey, flooding	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength, flooding	Severe: too clayey
Havre	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
8B: Harlake	Moderate: too clayey	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
Havre	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
9A: Havre	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
9B: Havre	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
9B: (cont.)						
Yamacall--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
10A:						
Havre-----------	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
11A:						
Havre-----------	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
Glendive--------	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
11B:						
Havre-----------	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Glendive--------	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
12A:						
Havre-----------	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Harlake---------	Moderate: too clayey, flooding	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength, flooding	Severe: too clayey
13A:						
Havre-----------	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
14A:						
Havre-----------	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
Glendive--------	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
14B:						
Havre-----------	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Glendive--------	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
15A:						
Havre-----------	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
15A:(cont.)						
Harlake	Moderate: too clayey	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
16A:						
Havre	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Yamacall	Slight	Moderate: shrink-swell	Slight	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
17A:						
Harlake	Moderate: too clayey	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
Havre	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
20B:						
Harlake	Moderate: too clayey, flooding	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: flooding, shrink-swell	Severe: shrink-swell, low strength, flooding	Severe: too clayey
Marvan	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
Vanda	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
21A:						
McKenzie	Severe: cutbanks cave, wetness	Severe: wetness, shrink-swell	Severe: wetness, shrink-swell	Severe: wetness, shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
22B:						
Nobe	Severe: wetness	Severe: shrink-swell	Severe: wetness, shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Moderate: excess salt, droughty
Absher	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: excess sodium, too clayey
23A:						
Gerdrum	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: excess sodium
Vanda	Slight	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
23B:						
Gerdrum	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: excess sodium
Vanda	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
Creed	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Severe: excess sodium
23C:						
Gerdrum	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: excess sodium
Creed	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Severe: excess sodium
25A:						
Vanda	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
26A:						
Weingart	Moderate: depth to rock, too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: excess sodium
26B:						
Weingart	Moderate: depth to rock, too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: excess sodium
Warhorse	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: depth to rock
30C:						
Busby	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
30D:						
Busby	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
31B:						
Delpoint	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
31C:						
Delpoint	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
31C:(cont.)						
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Yamacall--------	Moderate: slope	Moderate: shrink-swell, slope	Moderate: slope, shrink-swell	Severe: slope	Moderate: shrink-swell, slope, frost action	Moderate: slope
32B:						
Twilight--------	Moderate: depth to rock	Slight	Moderate: depth to rock	Moderate: slope	Moderate: frost action	Moderate: depth to rock
32D:						
Twilight--------	Moderate: depth to rock, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Moderate: slope, frost action	Moderate: slope, depth to rock
Blacksheep------	Severe: depth to rock	Moderate: slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, slope, frost action	Severe: depth to rock
Rock outcrop.						
33A:						
Yamacall--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
33B:						
Yamacall--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
34A:						
Yamacall--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
34B:						
Yamacall--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
35B:						
Yamacall--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
Busby-----------	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
36B:						
Yamacall--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
36B: (cont.)						
Delpoint	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
37A:						
Yamacall	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
37B:						
Yamacall	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
38A:						
Kobase	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Slight
Zatoville	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Slight
38B:						
Zatoville	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Slight
39B:						
Delpoint	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
39C:						
Delpoint	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Cabbart	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Yamacall	Moderate: slope	Moderate: shrink-swell, slope	Moderate: slope, shrink-swell	Severe: slope	Moderate: shrink-swell, slope, frost action	Moderate: slope
40B:						
Kobase	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Slight
40C:						
Kobase	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Slight

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
41A:						
Yamacall--------	Slight	Moderate: shrink-swell	Slight	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
41B:						
Yamacall--------	Slight	Moderate: shrink-swell	Slight	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
41C:						
Yamacall--------	Slight	Moderate: shrink-swell	Slight	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
Delpoint--------	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
50B:						
Hinterland------	Severe: depth to rock	Severe: shrink-swell, depth to rock	Severe: depth to rock, shrink-swell	Severe: shrink-swell, depth to rock	Severe: depth to rock, shrink-swell	Severe: depth to rock
50C:						
Hinterland------	Severe: depth to rock	Severe: shrink-swell, depth to rock	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope, depth to rock	Severe: depth to rock, shrink-swell	Severe: depth to rock
50D:						
Hinterland------	Severe: depth to rock	Severe: shrink-swell, depth to rock	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope, depth to rock	Severe: depth to rock, shrink-swell	Severe: depth to rock
Delplain--------	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock
51A:						
Ethridge--------	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
51B:						
Ethridge--------	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Slight
52A:						
Eapa------------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
52B:						
Eapa------------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Slight

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
53A:						
Tanna	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: depth to rock
54A:						
Marmarth	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
56A:						
Crago	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Severe: droughty
Musselshell	Slight	Slight	Slight	Slight	Moderate: frost action	Moderate: large stones
Attewan	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: droughty
57A:						
Attewan	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: droughty
57B:						
Attewan	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: small stones, large stones, droughty
57C:						
Attewan	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: droughty
Niart	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
58A:						
Verson	Moderate: too clayey	Slight	Slight	Slight	Slight	Moderate: droughty
60B:						
Abor	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
60C:						
Abor	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
Neldore	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
60D:						
Neldore	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
60D:(cont.)						
Abor	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: too clayey
60E:						
Neldore	Severe: slope, depth to rock	Severe: slope	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: shrink-swell slope, low strength	Severe: slope, depth to rock, too clayey
Abor	Severe: slope, cutbanks cave	Severe: slope	Severe: slope, shrink-swell	Severe: shrink-swell, slope	Severe: low strength, slope	Severe: slope, too clayey
61D:						
Neldore	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
Neldore, saline	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
61E:						
Neldore	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
Volborg	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
62C:						
Neldore	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
62D:						
Neldore	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
Yawdim	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock, too clayey
62E:						
Neldore	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock, too clayey
Rock outcrop.						
63A:						
Marias	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
64A:						
Marvan----------	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
Vanda-----------	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
64B:						
Marvan----------	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: too clayey
67D:						
Yawdim----------	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock
68C:						
Megonot---------	Moderate: depth to rock, too clayey, slope	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Moderate: slope, depth to rock
Yawdim----------	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock
69C:						
Orinoco---------	Moderate: depth to rock, too clayey, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Severe: low strength	Moderate: slope, depth to rock
Yawdim----------	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock
73D:						
Yawdim----------	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock
Abor------------	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: too clayey
73E:						
Yawdim----------	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock, too clayey
Abor------------	Severe: cutbanks cave, slope	Severe: shrink-swell, slope	Severe: slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, too clayey

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
74D:						
Abor	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: too clayey
Crago	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Severe: droughty
74E:						
Abor	Severe: cutbanks cave, slope	Severe: shrink-swell, slope	Severe: slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, too clayey
Crago	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
80E:						
Blacksheep	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop.						
Twilight	Severe: cutbanks cave	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Moderate: slope	Moderate: droughty, slope, depth to rock
81B:						
Delpoint	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
Cabbart	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
81C:						
Delpoint	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Cabbart	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
81D:						
Cabbart	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
82B:						
Cabbart	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Delpoint	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
82C:						
Cabbart	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Delpoint	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Rock outcrop.						
82E:						
Cabbart	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Delpoint	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Rock outcrop.						
83D:						
Cabbart	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop.						
Blacksheep	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
84C:						
Cabbart	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Yawdim	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock
Delpoint	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
84D:						
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Yawdim----------	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock
Rock outcrop.						
84E:						
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Yawdim----------	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock
Delpoint--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
85A:						
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
86D:						
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Rentsac---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: depth to rock	Severe: depth to rock
86E:						
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop.						
87B:						
Delpoint--------	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
88D:						
Delpoint--------	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop.						
89C:						
Rentsac---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock
90B:						
Chinook---------	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
91A:						
Kremlin---------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
91B:						
Kremlin---------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
92A:						
Binna-----------	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: droughty
93A:						
Crago-----------	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Severe: droughty
Musselshell-----	Slight	Slight	Slight	Slight	Moderate: frost action	Moderate: large stones
93B:						
Crago-----------	Severe: cutbanks cave, large stones	Severe: large stones	Severe: large stones	Severe: large stones	Severe: large stones	Severe: droughty
94A:						
Crago-----------	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Severe: droughty
94E:						
Crago-----------	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
95A:						
Crago-----------	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: frost action, large stones	Severe: droughty
Musselshell-----	Slight	Slight	Slight	Slight	Moderate: frost action	Severe: large stones

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
95B:						
Crago-----------	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: frost action, large stones	Severe: droughty
Attewan---------	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: small stones, large stones, droughty
Musselshell-----	Slight	Slight	Slight	Slight	Moderate: frost action	Severe: large stones
95C:						
Crago-----------	Severe: cutbanks cave, large stones	Severe: large stones	Severe: large stones	Severe: large stones	Severe: large stones	Severe: droughty
Attewan---------	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: small stones, large stones, droughty
95E:						
Yawdim----------	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock
Crago-----------	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
96E:						
Crago-----------	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Abor------------	Severe: cutbanks cave, slope	Severe: shrink-swell, slope	Severe: slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, too clayey
97A:						
Musselshell-----	Slight	Slight	Slight	Slight	Moderate: frost action	Severe: large stones
Crago-----------	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
97B:						
Musselshell-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: large stones
Crago-----------	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Severe: droughty
98A:						
Niart-----------	Slight	Slight	Slight	Slight	Moderate: frost action	Moderate: small stones,

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
98B:						
Niart	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
Crago	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Severe: droughty
98C:						
Niart	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
Crago	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Severe: droughty
98D:						
Niart	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
Rothiemay	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
123C:						
Creed	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Severe: excess sodium
Gerdrum	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Severe: excess sodium
130B:						
Busby	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Twilight	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
131C:						
Delpoint	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
Yamacall	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
132B:						
Twilight	Moderate: depth to rock	Slight	Moderate: depth to rock	Moderate: slope	Moderate: frost action	Moderate: depth to rock
Blacksheep	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: slope, depth to rock	Moderate: depth to rock, frost action	Severe: depth to rock
138B:						
Zatoville	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Slight

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
138B: (cont.)						
Orinoco----------	Moderate: depth to rock, too clayey	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Moderate: depth to rock
140B:						
Kobase-----------	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Slight
Megonot----------	Moderate: depth to rock, too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Moderate: depth to rock
140C:						
Kobase-----------	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Slight
Megonot----------	Moderate: depth to rock, too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Moderate: depth to rock
142A:						
Rothiemay--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, frost action	Slight
142B:						
Rothiemay--------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
142C:						
Rothiemay--------	Moderate: slope	Moderate: shrink-swell, slope	Moderate: slope, shrink-swell	Severe: slope	Moderate: shrink-swell, slope, frost action	Moderate: slope
Crago------------	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Severe: droughty
152A:						
Eapa-------------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Attewan----------	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: droughty
153C:						
Tanna------------	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell	Moderate: depth to rock
Cabbart----------	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
153D:						
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Tanna-----------	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, slope	Moderate: slope, depth to rock
154C:						
Marmarth--------	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
154D:						
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Marmarth--------	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
158A:						
Ethridge--------	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Verson----------	Moderate: too clayey	Slight	Slight	Slight	Slight	Moderate: droughty
167D:						
Yawdim----------	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock
Orinoco---------	Moderate: depth to rock, too clayey, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Severe: low strength	Moderate: slope, depth to rock
167E:						
Yawdim----------	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock
Orinoco---------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
181D:						
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Crago-----------	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Severe: droughty
Delpoint--------	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
181E:						
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Crago-----------	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Delpoint--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
189C:						
Rentsac---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: depth to rock	Severe: depth to rock
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
189E:						
Rentsac---------	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock
Rock outcrop.						
230C:						
Macar-----------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Slight
232E:						
Hughesville-----	Severe: depth to rock, large stones	Severe: large stones	Severe: depth to rock, large stones	Severe: slope, large stones	Severe: large stones	Severe: large stones
Tibs------------	Moderate: too clayey, large stones, slope	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: large stones

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
232E:(cont.)						
Whitecow	Moderate: large stones, slope	Moderate: slope, large stones	Moderate: slope, large stones	Severe: slope	Moderate: slope, frost action, large stones	Moderate: small stones, large stones, droughty
234F:						
Tibs	Severe: slope	Severe: shrink-swell, slope	Severe: slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: large stones, slope
Whitecow	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
240E:						
Ridge	Severe: depth to rock	Moderate: slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, slope, frost action	Severe: depth to rock
Dast	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
241E:						
Twilight	Moderate: depth to rock, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Moderate: slope, frost action	Moderate: slope, depth to rock
Blacksheep	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop.						
242D:						
Dast	Moderate: depth to rock	Slight	Moderate: depth to rock	Moderate: slope	Moderate: frost action	Moderate: depth to rock
Ridge	Severe: depth to rock	Moderate: depth to rock	Severe: depth to rock	Moderate: slope, depth to rock	Moderate: depth to rock, frost action	Severe: depth to rock
242F:						
Ridge	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Dast	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
243F:						
Blacksheep	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
243F: (cont.)						
Twilight--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
245C:						
Lamedeer--------	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: small stones, droughty
Ringling--------	Severe: large stones	Severe: large stones	Severe: large stones	Severe: large stones	Severe: large stones	Severe: droughty
245F:						
Lamedeer--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Ringling--------	Severe: large stones, slope	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: droughty, slope
246F:						
Lamedeer--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Ringling--------	Severe: large stones, slope	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: droughty, slope
250E:						
Macmeal---------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
251C:						
Savage----------	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength	Slight
252D:						
Hilger----------	Severe: large stones, slope	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope
Rock outcrop.						
252E:						
Hilger----------	Severe: large stones	Severe: large stones	Severe: large stones	Severe: slope, large stones	Severe: large stones	Moderate: small stones, large stones, droughty
254C:						
Fergus----------	Moderate: too clayey	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Severe: low strength	Slight

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
255C:						
Shambo	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, low strength, frost action	Slight
Korchea	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
Barvon	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
255D:						
Barvon	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
Cabba	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Shambo	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Slight
256C:						
Yamacall	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, frost action	Slight
Havre	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
Delpoint	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
260F:						
Kuro	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Severe: low strength	Severe: depth to rock
Wayden	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock
Rock outcrop.						
261F:						
Wayden	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
261F:(cont.)						
Castner---------	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock
262E:						
Wayden----------	Severe: depth to rock	Severe: shrink-swell	Severe: depth to rock, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength	Severe: depth to rock
Windham---------	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
280D:						
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Delpoint--------	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
280E:						
Castner---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: depth to rock	Severe: depth to rock
Kuro------------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Severe: low strength	Severe: depth to rock
281D:						
Doney-----------	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Cabba-----------	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Macar-----------	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Slight
281E:						
Castner---------	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock
Rock outcrop.						

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
282D:						
Castner	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: depth to rock	Severe: depth to rock
283D:						
Barvon	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
Cabba	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
283F:						
Cabba	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop.						
284D:						
Cabba	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Barvon	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
284F:						
Doney	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Wayden	Severe: depth to rock, slope	Severe: shrink-swell, slope	Severe: depth to rock, slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope, depth to rock
285D:						
Cabba	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Severe: depth to rock	Severe: slope	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
Doney	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
285F:						
Cabba	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Doney	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
286F:						
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Rock outcrop.						
287D:						
Delpoint--------	Moderate: depth to rock	Moderate: shrink-swell	Moderate: depth to rock, shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Moderate: depth to rock
Cabbart---------	Severe: depth to rock	Moderate: shrink-swell, depth to rock	Severe: depth to rock	Moderate: shrink-swell, slope, depth to rock	Moderate: depth to rock, shrink-swell, low strength	Severe: depth to rock
287F:						
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Delpoint--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
288D:						
Delpoint--------	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Havre-----------	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
288F:						
Cabbart---------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Delpoint--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
289D:						
Barvon----------	Moderate: depth to rock, slope	Moderate: shrink-swell, slope	Moderate: depth to rock, slope, shrink-swell	Severe: slope	Moderate: shrink-swell, low strength, slope	Moderate: slope, depth to rock
Cabba-----------	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Korchea---------	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
289F:						
Cabba	Severe: depth to rock, slope	Severe: slope	Severe: depth to rock, slope	Severe: slope	Severe: slope	Severe: slope, depth to rock
Barvon	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
291C:						
Windham	Moderate: large stones, slope	Moderate: slope, large stones	Moderate: slope, large stones	Severe: slope	Moderate: slope, frost action, large stones	Severe: small stones
292A:						
Straw	Severe: cutbanks cave	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: low strength, flooding, frost action	Slight
Korchea	Slight	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding, frost action	Slight
294C:						
Shambo	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell, slope	Moderate: shrink-swell, low strength, frost action	Slight
295F:						
Bitton	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Winifred	Severe: slope	Severe: shrink-swell, slope	Severe: slope, shrink-swell	Severe: shrink-swell, slope	Severe: shrink-swell, low strength, slope	Severe: slope
Castner	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock
296D:						
Borky	Severe: large stones	Severe: large stones	Severe: large stones	Severe: slope, large stones	Severe: low strength, large stones	Severe: small stones, large stones
Sinnigam	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: slope, depth to rock	Severe: depth to rock	Severe: large stones, depth to rock

Sanitary Facilities

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1E:					
Badland.					
2E:					
Rock outcrop.					
3A:					
Riverwash.					
5A:					
Harlake---------	Severe: percs slowly	Slight	Moderate: flooding	Moderate: flooding	Poor: hard to pack
6A:					
Harlake---------	Severe: flooding, percs slowly	Severe: flooding	Severe: flooding	Severe: flooding	Poor: hard to pack
7A:					
Lostriver-------	Severe: percs slowly	Slight	Moderate: flooding	Moderate: flooding	Poor: hard to pack
7B:					
Lostriver-------	Severe: percs slowly	Slight	Moderate: flooding	Moderate: flooding	Poor: hard to pack
Bullhook--------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
8A:					
Harlake---------	Severe: flooding, percs slowly	Severe: flooding	Severe: flooding	Severe: flooding	Poor: hard to pack
Havre-----------	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good
8B:					
Harlake---------	Severe: percs slowly	Slight	Moderate: flooding	Moderate: flooding	Poor: hard to pack
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
9A:					
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
9B:					
Havre-----------	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good
Yamacall--------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
10A:					
Havre-----------	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good
11A:					
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
Glendive--------	Moderate: flooding	Severe: seepage	Moderate: flooding, too sandy	Moderate: flooding	Fair: too sandy
11B:					
Havre-----------	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good
Glendive--------	Severe: flooding	Severe: seepage, flooding	Severe: flooding	Severe: flooding	Fair: too sandy
12A:					
Havre-----------	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good
Harlake---------	Severe: flooding, percs slowly	Severe: flooding	Severe: flooding	Severe: flooding	Poor: hard to pack
13A:					
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
14A:					
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
Glendive--------	Moderate: flooding	Severe: seepage	Moderate: flooding, too sandy	Moderate: flooding	Fair: too sandy
14B:					
Havre-----------	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good
Glendive--------	Severe: flooding	Severe: seepage, flooding	Severe: flooding	Severe: flooding	Fair: too sandy
15A:					
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
Harlake---------	Severe: percs slowly	Slight	Moderate: flooding	Moderate: flooding	Poor: hard to pack
16A:					
Havre-----------	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Good

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
16A: (cont.)					
Yamacall--------	Moderate: percs slowly	Severe: seepage	Slight	Slight	Fair: small stones
17A:					
Harlake---------	Severe: percs slowly	Slight	Moderate: flooding	Moderate: flooding	Poor: hard to pack
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding	Moderate: flooding	Good
20B:					
Harlake---------	Severe: flooding, percs slowly	Severe: flooding	Severe: flooding	Severe: flooding	Poor: hard to pack
Marvan----------	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Vanda-----------	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
21A:					
McKenzie--------	Severe: wetness, percs slowly	Slight	Severe: wetness, too clayey	Severe: wetness	Poor: too clayey, hard to pack, wetness
22B:					
Nobe------------	Severe: wetness, percs slowly	Moderate: slope	Severe: wetness, too clayey, excess salt	Severe: wetness	Poor: too clayey, hard to pack, excess salt
Absher----------	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium, excess salt	Slight	Poor: too clayey, hard to pack, excess salt
23A:					
Gerdrum---------	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium	Slight	Poor: too clayey, hard to pack, excess sodium
Vanda-----------	Slight	Moderate: slope	Slight	Slight	Poor: hard to pack
23B:					
Gerdrum---------	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium	Slight	Poor: too clayey, hard to pack, excess sodium
Vanda-----------	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
Creed-----------	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium	Slight	Poor: too clayey, excess sodium

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
23C:					
Gerdrum	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium	Slight	Poor: too clayey, hard to pack, excess sodium
Creed	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium	Slight	Poor: too clayey, excess sodium
25A:					
Vanda	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
26A:					
Weingart	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock, too clayey, excess sodium	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
26B:					
Weingart	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock, too clayey, excess sodium	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
Warhorse	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey
30C:					
Busby	Slight	Severe: seepage	Slight	Slight	Good
30D:					
Busby	Moderate: slope	Severe: seepage, slope	Moderate: slope	Moderate: slope	Fair: slope
31B:					
Delpoint	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
31C:					
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Yamacall	Moderate: percs slowly, slope	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
32B:					
Twilight	Severe: depth to rock	Severe: seepage, depth to rock	Severe: depth to rock	Slight	Poor: depth to rock

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
32D:					
Twilight--------	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Blacksheep------	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Rock outcrop.					
33A:					
Yamacall--------	Moderate: percs slowly	Moderate: seepage	Slight	Slight	Good
33B:					
Yamacall--------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
34A:					
Yamacall--------	Moderate: percs slowly	Moderate: seepage	Slight	Slight	Good
34B:					
Yamacall--------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
35B:					
Yamacall--------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
Busby-----------	Slight	Severe: seepage	Slight	Slight	Good
36B:					
Yamacall--------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
Delpoint--------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
37A:					
Yamacall--------	Slight	Severe: seepage	Slight	Slight	Fair: small stones
37B:					
Yamacall--------	Slight	Severe: seepage	Slight	Slight	Fair: small stones
38A:					
Kobase----------	Severe: percs slowly	Moderate: slope	Slight	Slight	Good

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
38A: (cont.) Zatoville	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
38B: Zatoville	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
39B: Delpoint	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
39C: Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Yamacall	Moderate: percs slowly, slope	Severe: slope	Moderate: slope	Moderate: slope	Fair: slope
40B: Kobase	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
40C: Kobase	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
41A: Yamacall	Moderate: percs slowly	Severe: seepage	Slight	Slight	Fair: small stones
41B: Yamacall	Moderate: percs slowly	Severe: seepage	Slight	Slight	Fair: small stones
41C: Yamacall	Moderate: percs slowly	Severe: seepage	Slight	Slight	Fair: small stones
Delpoint	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
50B: Hinterland	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, small stones
50C: Hinterland	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, small stones

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
50D:					
Hinterland	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, small stones
Delplain	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, small stones
51A:					
Ethridge	Severe: percs slowly	Slight	Slight	Slight	Good
51B:					
Ethridge	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
52A:					
Eapa	Moderate: percs slowly	Moderate: seepage	Slight	Slight	Good
52B:					
Eapa	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
53A:					
Tanna	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock, small stones
54A:					
Marmarth	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
56A:					
Crago	Severe: poor filter	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
Musselshell	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
Attewan	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
57A:					
Attewan	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
57B:					
Attewan	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
57C:					
Attewan	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
Niart	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Poor: small stones
58A:					
Verson	Slight	Severe: seepage	Slight	Slight	Poor: seepage, small stones
60B:					
Abor	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
60C:					
Abor	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
Neldore	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock, hard to pack
60D:					
Neldore	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
Abor	Severe: depth to rock, percs slowly	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
60E:					
Neldore	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: slope depth to rock	Severe: slope depth to rock	Poor: hard to pack, slope, depth to rock
Abor	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: slope, too clayey, depth to rock	Severe: slope, depth to rock	Poor: hard to pack, slope, depth to rock
61D:					
Neldore	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
Neldore, saline	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
61E:					
Neldore----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
Volborg----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
62C:					
Neldore----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
62D:					
Neldore----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
Yawdim-----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
62E:					
Neldore----------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Rock outcrop.					
63A:					
Marias-----------	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
64A:					
Marvan-----------	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
Vanda------------	Severe: percs slowly	Moderate: slope	Slight	Slight	Poor: hard to pack
64B:					
Marvan-----------	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey, hard to pack
67D:					
Yawdim-----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
68C:					
Megonot----------	Severe: depth to rock, percs slowly	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Yawdim-----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
69C:					
Orinoco	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Yawdim	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
73D:					
Yawdim	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
Abor	Severe: depth to rock, percs slowly	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
73E:					
Yawdim	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Abor	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
74D:					
Abor	Severe: depth to rock, percs slowly	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
Crago	Severe: poor filter	Severe: seepage, slope	Severe: seepage	Severe: seepage	Poor: seepage, small stones
74E:					
Abor	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Crago	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
80E:					
Blacksheep	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Rock outcrop.					

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
80E: (cont.)					
Twilight	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
81B:					
Delpoint	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
81C:					
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
81D:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
82B:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
82C:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Rock outcrop.					
82E:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Rock outcrop.					

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
83D:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Rock outcrop.					
Blacksheep	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
84C:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Yawdim	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
84D:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Yawdim	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Rock outcrop.					
84E:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Yawdim	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Delpoint	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
85A:					
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
86D:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
86D: (cont.)					
Rentsac---------	Severe: depth to rock	Severe: depth to rock, slope, large stones	Severe: depth to rock, large stones	Severe: depth to rock	Poor: depth to rock, small stones
86E:					
Cabbart---------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Rock outcrop.					
87B:					
Delpoint--------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Cabbart---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
88D:					
Delpoint--------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Cabbart---------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Rock outcrop.					
89C:					
Rentsac---------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock, small stones
90B:					
Chinook---------	Slight	Severe: seepage	Slight	Slight	Good
91A:					
Kremlin---------	Moderate: percs slowly	Moderate: seepage	Slight	Slight	Good
91B:					
Kremlin---------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
92A:					
Binna-----------	Severe: poor filter	Severe: seepage	Moderate: too sandy	Slight	Poor: small stones
93A:					
Crago-----------	Severe: poor filter	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
Musselshell-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
93B:					
Crago-----------	Severe: poor filter, large stones	Severe: seepage, large stones	Severe: seepage, large stones	Severe: seepage	Poor: small stones
94A:					
Crago-----------	Severe: poor filter	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
94E:					
Crago-----------	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
95A:					
Crago-----------	Severe: poor filter	Severe: seepage, large stones	Severe: seepage, large stones	Severe: seepage	Poor: small stones
Musselshell-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
95B:					
Crago-----------	Severe: poor filter	Severe: seepage, large stones	Severe: seepage, large stones	Severe: seepage	Poor: small stones
Attewan---------	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
Musselshell-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
95C:					
Crago-----------	Severe: poor filter, large stones	Severe: seepage, large stones	Severe: seepage, large stones	Severe: seepage	Poor: small stones
Attewan---------	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
95E:					
Yawdim----------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Crago-----------	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
96E:					
Crago-----------	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
96E: (cont.)					
Abor------------	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
97A:					
Musselshell-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
Crago-----------	Severe: poor filter	Severe: seepage	Severe: seepage, large stones	Severe: seepage	Poor: small stones
97B:					
Musselshell-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
Crago-----------	Severe: poor filter	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
98A:					
Niart-----------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Poor: small stones
98B:					
Niart-----------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Poor: small stones
Crago-----------	Severe: poor filter	Severe: seepage	Severe: seepage	Severe: seepage	Poor: seepage, small stones
98C:					
Niart-----------	Moderate: percs slowly, slope	Severe: slope	Moderate: slope	Moderate: slope	Poor: small stones
Crago-----------	Severe: poor filter	Severe: seepage, slope	Severe: seepage	Severe: seepage	Poor: seepage, small stones
98D:					
Niart-----------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Poor: small stones
Rothiemay-------	Severe: percs slowly	Moderate: seepage, slope	Slight	Slight	Fair: small stones
123C:					
Creed-----------	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium	Slight	Poor: too clayey, excess sodium

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
123C: (cont.)					
Gerdrum	Severe: percs slowly	Moderate: slope	Severe: too clayey, excess sodium	Slight	Poor: too clayey, hard to pack, excess sodium
130B:					
Busby	Slight	Severe: seepage	Slight	Slight	Good
Twilight	Moderate: percs slowly	Severe: seepage	Slight	Slight	Poor: thin layer
131C:					
Delpoint	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Yamacall	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
132B:					
Twilight	Severe: depth to rock	Severe: seepage, depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Blacksheep	Severe: depth to rock	Severe: seepage, depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
138B:					
Zatoville	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Orinoco	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
140B:					
Kobase	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Megonot	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
140C:					
Kobase	Severe: percs slowly	Moderate: slope	Slight	Slight	Good
Megonot	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
142A:					
Rothiemay	Severe: percs slowly	Moderate: seepage	Slight	Slight	Fair: small stones
142B:					
Rothiemay	Severe: percs slowly	Moderate: seepage, slope	Slight	Slight	Fair: small stones

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
142C:					
Rothiemay	Severe: percs slowly	Severe: slope	Moderate: slope	Moderate: slope	Fair: small stones, slope
Crago	Severe: poor filter	Severe: seepage, slope	Severe: seepage	Severe: seepage	Poor: seepage, small stones
152A:					
Eapa	Moderate: percs slowly	Moderate: seepage	Slight	Slight	Good
Attewan	Severe: poor filter	Severe: seepage	Severe: too sandy	Slight	Poor: seepage, too sandy, small stones
153C:					
Tanna	Severe: depth to rock, percs slowly	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock, small stones
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
153D:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Tanna	Severe: depth to rock, percs slowly	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, small stones
154C:					
Marmarth	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
154D:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Marmarth	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
158A:					
Ethridge	Severe: percs slowly	Slight	Slight	Slight	Good
Verson	Slight	Severe: seepage	Slight	Slight	Poor: seepage, small stones

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
167D:					
Yawdim	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock, hard to pack
Orinoco	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
167E:					
Yawdim	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, hard to pack, slope
Orinoco	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
181D:					
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Crago	Severe: poor filter	Severe: seepage, slope	Severe: seepage	Severe: seepage	Poor: seepage, small stones
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
181E:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Crago	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Delpoint	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
189C:					
Rentsac	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock, small stones
Cabbart	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
189E:					
Rentsac	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Rock outcrop.					

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
230C:					
Macar	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
232E:					
Hughesville	Severe: depth to rock, large stones	Severe: depth to rock, slope, large stones	Severe: depth to rock, large stones	Severe: depth to rock	Poor: depth to rock, small stones
Tibs	Severe: percs slowly	Severe: slope, large stones	Severe: too clayey, large stones	Moderate: slope	Poor: too clayey, hard to pack, large stones
Whitecow	Moderate: percs slowly, slope, large stones	Severe: slope	Severe: large stones	Moderate: slope	Poor: small stones
234F:					
Tibs	Severe: percs slowly, slope	Severe: slope, large stones	Severe: slope, too clayey, large stones	Severe: slope	Poor: too clayey, hard to pack, large stones
Whitecow	Severe: slope	Severe: slope	Severe: slope, large stones	Severe: slope	Poor: small stones, slope
240E:					
Ridge	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage	Severe: depth to rock	Poor: depth to rock
Dast	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, seepage, slope	Poor: depth to rock, slope
Rock outcrop.					
241E:					
Twilight	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Blacksheep	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Rock outcrop.					
242D:					
Dast	Severe: depth to rock	Severe: seepage, depth to rock	Severe: depth to rock, seepage	Severe: depth to rock, seepage	Poor: depth to rock

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
242D: (cont.)					
Ridge-----------	Severe: depth to rock	Severe: seepage, depth to rock	Severe: depth to rock, seepage	Severe: depth to rock	Poor: depth to rock
242F:					
Ridge-----------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Dast------------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, seepage, slope	Poor: depth to rock, slope
243F:					
Blacksheep------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Twilight--------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
245C:					
Lamedeer--------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Poor: small stones
Ringling--------	Severe: poor filter, large stones	Severe: seepage	Severe: seepage, large stones	Severe: seepage	Poor: seepage, small stones
245F:					
Lamedeer--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Ringling--------	Severe: poor filter, slope, large stones	Severe: seepage, slope	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: seepage, small stones, slope
246F:					
Lamedeer--------	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Ringling--------	Severe: poor filter, slope, large stones	Severe: seepage, slope	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: seepage, small stones, slope
250E:					
Macmeal---------	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Rock outcrop.					

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
251C:					
Savage----------	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey
252D:					
Hilger----------	Severe: slope, large stones	Severe: slope, large stones	Severe: slope, large stones	Severe: slope	Poor: small stones, slope
Rock outcrop.					
252E:					
Hilger----------	Severe: large stones	Severe: slope, large stones	Severe: large stones	Moderate: slope	Poor: small stones
254C:					
Fergus----------	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey
255C:					
Shambo----------	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
Korchea---------	Moderate: flooding, percs slowly	Moderate: seepage, slope	Moderate: flooding, too clayey	Moderate: flooding	Fair: too clayey
Barvon----------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
255D:					
Barvon----------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Cabba-----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Shambo----------	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
256C:					
Yamacall--------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good
Havre-----------	Moderate: flooding, percs slowly	Moderate: seepage, slope	Moderate: flooding	Moderate: flooding	Good
Delpoint--------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
260F:					
Kuro------------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
260F:(cont.)					
Wayden----------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Rock outcrop.					
261F:					
Wayden----------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Castner---------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, seepage, small stones
262E:					
Wayden----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey, hard to pack
Windham---------	Moderate: percs slowly, large stones	Moderate: seepage, slope, large stones	Moderate: too clayey, large stones	Slight	Poor: seepage, small stones
280D:					
Cabbart---------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Delpoint--------	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
280E:					
Castner---------	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage	Severe: depth to rock	Poor: depth to rock, seepage, small stones
Kuro------------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey
281D:					
Doney-----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Cabba-----------	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Macar-----------	Moderate: percs slowly	Moderate: seepage, slope	Slight	Slight	Good

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
281E:					
Castner	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, seepage, small stones
Rock outcrop.					
282D:					
Castner	Severe: depth to rock	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage	Severe: depth to rock	Poor: depth to rock, seepage, small stones
283D:					
Barvon	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Cabba	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
283F:					
Cabba	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Rock outcrop.					
284D:					
Cabba	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Barvon	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
284F:					
Doney	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Wayden	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
285D:					
Cabba	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Doney	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
285F:					
Cabba	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
285F: (cont.)					
Doney	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
286F:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Rock outcrop.					
287D:					
Delpoint	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
Cabbart	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Slight	Poor: depth to rock
287F:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Delpoint	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
288D:					
Delpoint	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Moderate: slope	Poor: depth to rock
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Havre	Moderate: flooding, percs slowly	Moderate: seepage, slope	Moderate: flooding	Moderate: flooding	Good
288F:					
Cabbart	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
Delpoint	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: slope	Poor: depth to rock, slope
289D:					
Barvon	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
Cabba	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Korchea	Moderate: flooding, percs slowly	Moderate: seepage, slope	Moderate: flooding, too clayey	Moderate: flooding	Fair: too clayey

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
289F:					
Cabba-----------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
Barvon----------	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, slope
291C:					
Windham---------	Moderate: percs slowly, slope, large stones	Severe: slope	Moderate: slope, too clayey, large stones	Moderate: slope	Poor: seepage, small stones
292A:					
Straw-----------	Moderate: flooding, percs slowly	Severe: seepage	Severe: seepage	Moderate: flooding	Fair: too clayey
Korchea---------	Moderate: flooding, percs slowly	Moderate: seepage	Moderate: flooding, too clayey	Moderate: flooding	Fair: too clayey
294C:					
Shambo----------	Moderate: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Fair: too clayey
295F:					
Bitton----------	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
Winifred--------	Severe: depth to rock, percs slowly, slope	Severe: depth to rock, slope	Severe: depth to rock, slope, too clayey	Severe: depth to rock, slope	Poor: depth to rock, too clayey, hard to pack
Castner---------	Severe: depth to rock, slope	Severe: seepage, depth to rock, slope	Severe: depth to rock, seepage, slope	Severe: depth to rock, slope	Poor: depth to rock, seepage, small stones
296D:					
Borky-----------	Severe: depth to rock, percs slowly, large stones	Severe: depth to rock, slope, large stones	Severe: depth to rock, too clayey, large stones	Severe: depth to rock	Poor: depth to rock, too clayey, large stones
Sinnigam--------	Severe: depth to rock	Severe: depth to rock, slope, large stones	Severe: depth to rock, too clayey, large stones	Severe: depth to rock	Poor: depth to rock, too clayey, small stones

Construction Materials

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1E:				
Badland.				
2E:				
Rock outcrop.				
3A:				
Riverwash.				
5A:				
Harlake	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
6A:				
Harlake	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
7A:				
Lostriver	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
7B:				
Lostriver	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Bullhook	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: excess salt
8A:				
Harlake	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Havre	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
8B:				
Harlake	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Havre	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
9A:				
Havre	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
9B:				
Havre	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Yamacall	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
10A:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
11A:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Glendive--------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too sandy, too clayey, small stones
11B:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Glendive--------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too sandy, small stones, excess salt
12A:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Harlake---------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
13A:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
14A:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Glendive--------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too sandy, too clayey, small stones
14B:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Glendive--------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too sandy, small stones, excess salt
15A:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Harlake---------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
16A:				
Havre-----------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
16A: (cont.)				
Yamacall	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
17A:				
Harlake	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Havre	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
20B:				
Harlake	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Marvan	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Vanda	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
21A:				
McKenzie	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
22B:				
Nobe	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Absher	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
23A:				
Gerdrum	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Vanda	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
23B:				
Gerdrum	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Vanda	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Creed	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
23C:				
Gerdrum	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
Creed	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium
25A:				
Vanda	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
26A:				
Weingart	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium
26B:				
Weingart	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium
Warhorse	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
30C:				
Busby	Good	Improbable: excess fines	Improbable: excess fines	Good
30D:				
Busby	Good	Improbable: excess fines	Improbable: excess fines	Fair: slope
31B:				
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
31C:				
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Yamacall	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
32B:				
Twilight	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, thin layer

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
32D:				
Twilight--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, thin layer, slope
Blacksheep------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Rock outcrop.				
33A:				
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
33B:				
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
34A:				
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
34B:				
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
35B:				
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Busby-----------	Good	Improbable: excess fines	Improbable: excess fines	Good
36B:				
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
37A:				
Yamacall--------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
37B:				
Yamacall--------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
38A:				
Kobase----------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
38A: (cont.) Zatoville	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
38B: Zatoville	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
39B: Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
39C: Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Yamacall	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
40B: Kobase	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
40C: Kobase	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
41A: Yamacall	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
41B: Yamacall	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
41C: Yamacall	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
50B: Hinterland	Poor: depth to rock, shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, small stones

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
50C:				
Hinterland------	Poor: depth to rock, shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, small stones
50D:				
Hinterland------	Poor: depth to rock, shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, small stones
Delplain--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, small stones
51A:				
Ethridge--------	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
51B:				
Ethridge--------	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
52A:				
Eapa------------	Fair: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
52B:				
Eapa------------	Fair: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
53A:				
Tanna-----------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones
54A:				
Marmarth--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, thin layer
56A:				
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim
Musselshell-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Attewan---------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
57A:				
Attewan---------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
57B:				
Attewan---------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
57C:				
Attewan---------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Niart-----------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
58A:				
Verson----------	Good	Improbable: small stones	Probable	Poor: small stones, area reclaim
60B:				
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
60C:				
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Neldore---------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
60D:				
Neldore---------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
60E:				
Neldore---------	Poor: depth to rock, shrink-swell low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope, depth to rock
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
61D:				
Neldore	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Neldore, saline	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
61E:				
Neldore	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Volborg	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
62C:				
Neldore	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
62D:				
Neldore	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Yawdim	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
62E:				
Neldore	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Rock outcrop.				
63A:				
Marias	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
64A:				
Marvan	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Vanda	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
64B:				
Marvan----------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
67D:				
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
68C:				
Megonot---------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
69C:				
Orinoco---------	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
73D:				
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
73E:				
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
74D:				
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
74E:				
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Crago-----------	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
80E:				
Blacksheep------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Rock outcrop.				
Twilight--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too sandy, thin layer
81B:				
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
81C:				
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
81D:				
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
82B:				
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
82C:				
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Rock outcrop.				

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
82E:				
Cabbart	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Rock outcrop.				
83D:				
Cabbart	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Rock outcrop.				
Blacksheep	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
84C:				
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Yawdim	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
84D:				
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Yawdim	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Rock outcrop.				
84E:				
Cabbart	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Yawdim	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Delpoint	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
85A:				
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
86D:				
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Rentsac---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones
86E:				
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Rock outcrop.				
87B:				
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
88D:				
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Rock outcrop.				
89C:				
Rentsac---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones
90B:				
Chinook---------	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
91A:				
Kremlin---------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
91B:				
Kremlin---------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
92A:				
Binna-----------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
93A:				
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim
Musselshell-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
93B:				
Crago-----------	Poor: large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim
94A:				
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim
94E:				
Crago-----------	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
95A:				
Crago-----------	Fair: large stones	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Musselshell-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
95B:				
Crago-----------	Fair: large stones	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Attewan---------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
Musselshell-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
95C:				
Crago-----------	Poor: large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim
Attewan---------	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
95E:				
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
95E: (cont.)				
Crago-----------	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
96E:				
Crago-----------	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Abor------------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
97A:				
Musselshell-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Crago-----------	Fair: large stones	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
97B:				
Musselshell-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim
98A:				
Niart-----------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
98B:				
Niart-----------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim
98C:				
Niart-----------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim
98D:				
Niart-----------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
98D: (cont.)				
Rothiemay-------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: small stones
123C:				
Creed-----------	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess sodium
Gerdrum---------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt, excess sodium
130B:				
Busby-----------	Good	Improbable: excess fines	Improbable: excess fines	Good
Twilight--------	Poor: thin layer	Improbable: excess fiens	Improbable: excess fines	Fair: thin layer
131C:				
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
132B:				
Twilight--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, thin layer
Blacksheep------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
138B:				
Zatoville-------	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, excess salt
Orinoco---------	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
140B:				
Kobase----------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
Megonot---------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones
140C:				
Kobase----------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
140C: (cont.)				
Megonot	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones
142A:				
Rothiemay	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: small stones
142B:				
Rothiemay	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: small stones
142C:				
Rothiemay	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Crago	Good	Probable	Probable	Poor: small stones, area reclaim
152A:				
Eapa	Fair: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones
Attewan	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
153C:				
Tanna	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
153D:				
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Tanna	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: small stones
154C:				
Marmarth	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, thin layer
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
154D:				
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
154D: (cont.)				
Marmarth--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, thin layer
158A:				
Ethridge--------	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: thin layer
Verson----------	Good	Improbable: small stones	Probable	Poor: small stones, area reclaim
167D:				
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Orinoco---------	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
167E:				
Yawdim----------	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Orinoco---------	Poor: depth to rock, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
181D:				
Cabbart---------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Crago-----------	Good	Probable	Probable	Poor: small stones, area reclaim
Delpoint--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
181E:				
Cabbart---------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Crago-----------	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Delpoint--------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
189C:				
Rentsac	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
189E:				
Rentsac	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
Rock outcrop.				
230C:				
Macar	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
232E:				
Hughesville	Poor: depth to rock, large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones
Tibs	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, area reclaim, small stones
Whitecow	Fair: large stones	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
234F:				
Tibs	Poor: shrink-swell, low strength, slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, area reclaim, small stones
Whitecow	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
240E:				
Ridge	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Dast	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
Rock outcrop.				
241E:				
Twilight	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, thin layer, slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
241E: (cont.)				
Blacksheep------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Rock outcrop.				
242D:				
Dast------------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, small stones, thin layer
Ridge-----------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
242F:				
Ridge-----------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Dast------------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
243F:				
Blacksheep------	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Twilight--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
245C:				
Lamedeer--------	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Ringling--------	Poor: large stones	Improbable: small stones, large stones	Improbable: large stones	Poor: small stones, area reclaim
245F:				
Lamedeer--------	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Ringling--------	Poor: large stones	Improbable: small stones, large stones	Improbable: large stones	Poor: small stones, area reclaim, slope
246F:				
Lamedeer--------	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Ringling--------	Poor: large stones	Improbable: small stones, large stones	Improbable: large stones	Poor: small stones, area reclaim, slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
250E:				
Macmeal---------	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Rock outcrop.				
251C:				
Savage----------	Poor: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
252D:				
Hilger----------	Poor: large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim, slope
Rock outcrop.				
252E:				
Hilger----------	Poor: large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim
254C:				
Fergus----------	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
255C:				
Shambo----------	Fair: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Korchea---------	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Barvon----------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
255D:				
Barvon----------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabba-----------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Shambo----------	Fair: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
256C:				
Yamacall--------	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
256C: (cont.)				
Havre	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
260F:				
Kuro	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Wayden	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Rock outcrop.				
261F:				
Wayden	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope
Castner	Poor: depth to rock	Improbable: small stones	Improbable: thin layer	Poor: depth to rock, small stones, slope
262E:				
Wayden	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey
Windham	Fair: large stones	Probable	Probable	Poor: small stones, area reclaim
280D:				
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
280E:				
Castner	Poor: depth to rock	Improbable: small stones	Improbable: thin layer	Poor: depth to rock, small stones
Kuro	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
281D:				
Doney	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabba	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Macar	Fair: shrink-swell	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
281E:				
Castner	Poor: depth to rock, slope	Improbable: small stones	Improbable: thin layer	Poor: depth to rock, small stones, slope
Rock outcrop.				
282D:				
Castner	Poor: depth to rock	Improbable: small stones	Improbable: thin layer	Poor: depth to rock, small stones
283D:				
Barvon	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabba	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
283F:				
Cabba	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Rock outcrop.				
284D:				
Cabba	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Barvon	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
284F:				
Doney	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
Wayden	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
285D:				
Cabba	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
Doney	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
285F:				
Cabba	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Doney	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
286F:				
Cabbart	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Rock outcrop.				
287D:				
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock
287F:				
Cabbart	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: slope
288D:				
Delpoint	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabbart	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Havre	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
288F:				
Cabbart	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
288F: (cont.)				
Delpoint	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
289D:				
Barvon	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
Cabba	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Korchea	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
289F:				
Cabba	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, slope
Barvon	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
291C:				
Windham	Fair: large stones	Probable	Probable	Poor: small stones, area reclaim
292A:				
Straw	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
Korchea	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
294C:				
Shambo	Fair: shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey
295F:				
Bitton	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Winifred	Poor: depth to rock, shrink-swell, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
Castner	Poor: depth to rock, slope	Improbable: small stones	Improbable: thin layer	Poor: depth to rock, small stones, slope

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
296D:				
Borky-----------	Poor: depth to rock, low strength, large stones	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: too clayey, large stones
Sinnigam--------	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, too clayey, small stones

Water Management

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation.)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1E:							
Badland.							
2E:							
Rock outcrop.							
3A:							
Riverwash.							
5A:							
Harlake	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
6A:							
Harlake	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly, flooding	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
7A:							
Lostriver	Slight	Moderate: hard to pack, excess salt	Severe: no water	Deep to water	Slow intake, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, excess salt, erodes easily
7B:							
Lostriver	Slight	Moderate: hard to pack, excess salt	Severe: no water	Deep to water	Slow intake, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, excess salt, erodes easily
Bullhook	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, excess salt	Erodes easily	Too arid, excess salt, erodes easily
8A:							
Harlake	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly, flooding	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Havre	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, flooding	Erodes easily	Too arid, erodes easily
8B:							
Harlake	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Havre	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
9A:							
Havre	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
9B:							
Havre	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, flooding	Erodes easily	Too arid, erodes easily
Yamacall	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
10A:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, flooding	Erodes easily	Too arid, erodes easily
11A:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
Glendive--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing, excess salt	Soil blowing	Too arid
11B:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, flooding	Erodes easily	Too arid, erodes easily
Glendive--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing, flooding, excess salt	Soil blowing	Too arid
12A:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, flooding	Erodes easily	Too arid, erodes easily
Harlake---------	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly, flooding	Percs slowly	Too arid, percs slowly
13A:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
14A:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
Glendive--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing, excess salt	Soil blowing	Too arid
14B:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, flooding	Erodes easily	Too arid, erodes easily
Glendive--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Soil blowing, flooding, excess salt	Soil blowing	Too arid
15A:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
Harlake---------	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
16A:							
Havre-----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily, flooding	Erodes easily	Too arid, erodes easily
Yamacall--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily

Water Management--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
17A:							
Harlake	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Havre	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
20B:							
Harlake	Slight	Moderate: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly, flooding	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Marvan	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly, erodes easily	Erodes easily, percs slowly	Erodes easily, percs slowly
Vanda	Slight	Severe: hard to pack	Severe: no water	Deep to water	Droughty, slow intake, percs slowly	Erodes easily, percs slowly	Too arid, excess salt, erodes easily
21A:							
McKenzie	Slight	Severe: hard to pack	Severe: no water	Percs slowly	Wetness, slow intake, percs slowly	Erodes easily, wetness, percs slowly	Wetness, excess salt, erodes easily
22B:							
Nobe	Slight	Severe: excess salt	Severe: slow refill, salty water	Percs slowly, excess salt	Wetness, droughty, percs slowly	Erodes easily, wetness, percs slowly	Excess salt, erodes easily, droughty
Absher	Slight	Severe: excess sodium, excess salt	Severe: no water	Deep to water	Droughty, slow intake, percs slowly	Erodes easily, percs slowly	Excess salt, excess sodium, erodes easily
23A:							
Gerdrum	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, droughty, percs slowly	Erodes easily, percs slowly	Excess sodium, erodes easily, droughty
Vanda	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, droughty, slow intake	Erodes easily, percs slowly	Too arid, excess salt, erodes easily
23B:							
Gerdrum	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, droughty, percs slowly	Erodes easily, percs slowly	Excess sodium, erodes easily, droughty
Vanda	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, droughty, slow intake	Erodes easily, percs slowly	Too arid, excess salt, erodes easily
Creed	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, droughty, percs slowly	Erodes easily, percs slowly	Excess sodium, erodes easily, droughty
23C:							
Gerdrum	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, droughty, percs slowly	Erodes easily, percs slowly	Excess sodium, erodes easily, droughty

Water Management--Continued

	Limitations for--			Features affecting--			
Map symbol and soil name	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
23C: (cont.)							
Creed-----------	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, droughty, percs slowly	Erodes easily, percs slowly	Excess sodium, erodes easily, droughty
25A:							
Vanda-----------	Slight	Severe: hard to pack	Severe: no water	Deep to water	Droughty, slow intake, percs slowly	Erodes easily, percs slowly	Too arid, excess salt, erodes easily
26A:							
Weingart--------	Moderate: depth to rock, slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Excess sodium, erodes easily, depth to rock
26B:							
Weingart--------	Moderate: depth to rock, slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Excess sodium, erodes easily, depth to rock
Warhorse--------	Severe: depth to rock	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Erodes easily, depth to rock, percs slowly
30C:							
Busby-----------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing	Soil blowing	Too arid
30D:							
Busby-----------	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing	Slope, soil blowing	Too arid, slope
31B:							
Delpoint--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
31C:							
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Yamacall--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Slope, erodes easily	Too arid, slope, erodes easily
32B:							
Twilight--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Depth to rock, soil blowing	Too arid, depth to rock
32D:							
Twilight--------	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
32D: (cont.)							
Blacksheep------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock
Rock outcrop.							
33A:							
Yamacall--------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
33B:							
Yamacall--------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
34A:							
Yamacall--------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Erodes easily	Too arid, erodes easily
34B:							
Yamacall--------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope	Erodes easily	Too arid, erodes easily
35B:							
Yamacall--------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
Busby-----------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing	Soil blowing	Too arid
36B:							
Yamacall--------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
Delpoint--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
37A:							
Yamacall--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Erodes easily	Too arid, erodes easily
37B:							
Yamacall--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope	Erodes easily	Too arid, erodes easily
38A:							
Kobase----------	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Zatoville-------	Moderate: slope	Moderate: excess salt	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
38B:							
Zatoville-------	Moderate: slope	Moderate: excess salt	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
39B:							
Delpoint--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
39C:							
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Yamacall--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Slope, erodes easily	Too arid, slope, erodes easily
40B:							
Kobase----------	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
40C:							
Kobase----------	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
41A:							
Yamacall--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
41B:							
Yamacall--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
41C:							
Yamacall--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
Delpoint--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
50B:							
Hinterland------	Severe: depth to rock	Severe: thin layer	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Erodes easily, depth to rock
50C:							
Hinterland------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
50D:							
Hinterland------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Delplain--------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, droughty, depth to rock	Slope, depth to rock	Slope, droughty, depth to rock
51A:							
Ethridge--------	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
51B:							
Ethridge--------	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
52A:							
Eapa------------	Moderate: seepage	Moderate: piping	Severe: no water	Deep to water	Favorable	Favorable	Too arid
52B:							
Eapa------------	Moderate: seepage, slope	Moderate: piping	Severe: no water	Deep to water	Slope	Favorable	Too arid
53A:							
Tanna-----------	Moderate: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Too arid, erodes easily, depth to rock
54A:							
Marmarth--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Depth to rock, soil blowing	Too arid, depth to rock
56A:							
Crago-----------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Too sandy	Droughty
Musselshell-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Rooting depth, erodes easily	Erodes easily	Erodes easily, rooting depth
Attewan---------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, erodes easily	Erodes easily, too sandy	Too arid, erodes easily, droughty
57A:							
Attewan---------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, erodes easily	Erodes easily, too sandy	Too arid, erodes easily, droughty
57B:							
Attewan---------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Large stones, too sandy	Too arid, large stones, droughty

Water Management--Continued

	Limitations for--			Features affecting--			
Map symbol and soil name	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
57C:							
Attewan----------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, erodes easily	Erodes easily, too sandy	Too arid, erodes easily, droughty
Niart------------	Moderate: seepage	Severe: seepage	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
58A:							
Verson-----------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, percs slowly, erodes easily	Erodes easily	Too arid, erodes easily, droughty
60B:							
Abor-------------	Moderate: depth to rock, slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Depth to rock, erodes easily, percs slowly	Erodes easily, depth to rock, percs slowly
60C:							
Abor-------------	Moderate: depth to rock, slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Depth to rock, erodes easily, percs slowly	Erodes easily, depth to rock, percs slowly
Neldore----------	Severe: depth to rock	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Depth to rock, percs slowly	Too arid, depth to rock, percs slowly
60D:							
Neldore----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
Abor-------------	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
60E:							
Neldore----------	Severe: depth to rock, slope,	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock	Depth to rock, slope, too arid
Abor-------------	Severe: slope	Severe: hard to pack thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, erodes easily	Slope, erodes easily depth to rock
61D:							
Neldore----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
Neldore, saline-	Severe: depth to rock, slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
61E:							
Neldore----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
61E: (cont.)							
Volborg----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, soil blowing	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock
62C:							
Neldore----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
62D:							
Neldore----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
Yawdim----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
62E:							
Neldore----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
Rock outcrop.							
63A:							
Marias----------	Slight	Severe: hard to pack	Severe: no water	Deep to water	Slow intake, percs slowly, erodes easily	Erodes easily, percs slowly	Erodes easily, percs slowly
64A:							
Marvan----------	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Erodes easily, percs slowly	Erodes easily, percs slowly
Vanda-----------	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, droughty, slow intake	Erodes easily, percs slowly	Too arid, excess salt, erodes easily
64B:							
Marvan----------	Moderate: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Erodes easily, percs slowly	Erodes easily, percs slowly
67D:							
Yawdim----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
68C:							
Megonot---------	Severe: slope	Moderate: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Yawdim----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily

Water Management--Continued

	Limitations for--			Features affecting--			
Map symbol and soil name	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
69C:							
Orinoco----------	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Yawdim-----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
73D:							
Yawdim-----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Abor-------------	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
73E:							
Yawdim-----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, percs slowly	Too arid, slope, depth to rock
Abor-------------	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
74D:							
Abor-------------	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Crago------------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
74E:							
Abor-------------	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Crago------------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
80E:							
Blacksheep-------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock
Rock outcrop.							
Twilight---------	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, depth to rock, soil blowing	Too arid, slope, droughty
81B:							
Delpoint---------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
81B: (cont.)							
Cabbart---------	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
81C:							
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
81D:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
82B:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
82C:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rock outcrop.							
82E:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rock outcrop.							
83D:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rock outcrop.							
Blacksheep------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
84C:							
Cabbart----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Yawdim-----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint---------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
84D:							
Cabbart----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Yawdim-----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rock outcrop.							
84E:							
Cabbart----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Yawdim-----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint---------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
85A:							
Cabbart----------	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Depth to rock, excess salt	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
86D:							
Cabbart----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rentsac----------	Severe: depth to rock, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
86E:							
Cabbart----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rock outcrop.							

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
87B:							
Delpoint---------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
Cabbart----------	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
88D:							
Delpoint---------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Cabbart----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rock outcrop.							
89C:							
Rentsac----------	Severe: depth to rock	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones, depth to rock, soil blowing	Large stones, droughty, depth to rock
90B:							
Chinook----------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing	Soil blowing	Too arid
91A:							
Kremlin----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
91B:							
Kremlin----------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
92A:							
Binna------------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, erodes easily	Erodes easily, too sandy	Too arid, erodes easily, droughty
93A:							
Crago------------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Too sandy	Droughty
Musselshell------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Rooting depth, erodes easily	Erodes easily	Erodes easily, rooting depth
93B:							
Crago------------	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones, too sandy	Large stones, droughty, rooting depth
94A:							
Crago------------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Too sandy	Droughty

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
94E:							
Crago-----------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
95A:							
Crago-----------	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Large stones, droughty, rooting depth	Large stones, too sandy	Large stones, droughty, rooting depth
Musselshell-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Rooting depth	Large stones	Large stones, rooting depth
95B:							
Crago-----------	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Large stones, droughty, rooting depth	Large stones, too sandy	Large stones, droughty, rooting depth
Attewan---------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Large stones, erodes easily, too sandy	Too arid, large stones, erodes easily
Musselshell-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Rooting depth	Large stones	Large stones, rooting depth
95C:							
Crago-----------	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones, too sandy	Large stones, droughty, rooting depth
Attewan---------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Large stones, too sandy	Too arid, large stones, droughty
95E:							
Yawdim----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Crago-----------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
96E:							
Crago-----------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
Abor------------	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, slow intake, percs slowly	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
97A:							
Musselshell-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Rooting depth	Large stones	Large stones, rooting depth
Crago-----------	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Large stones, droughty, rooting depth	Large stones, too sandy	Large stones, droughty, rooting depth

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
97B:							
Musselshell-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, rooting depth, erodes easily	Erodes easily	Erodes easily, rooting depth
Crago-----------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Too sandy	Droughty
98A:							
Niart-----------	Moderate: seepage	Severe: seepage	Severe: no water	Deep to water	Favorable	Favorable	Too arid
98B:							
Niart-----------	Moderate: seepage	Severe: seepage	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
Crago-----------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Too sandy	Droughty
98C:							
Niart-----------	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, erodes easily	Slope, erodes easily	Too arid, slope, erodes easily
Crago-----------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
98D:							
Niart-----------	Moderate: seepage	Severe: seepage	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
Rothiemay-------	Slight	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
123C:							
Creed-----------	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, droughty, percs slowly	Erodes easily, percs slowly	Excess sodium, erodes easily, droughty
Gerdrum---------	Moderate: slope	Severe: excess sodium	Severe: no water	Deep to water	Slope, droughty, percs slowly	Erodes easily, percs slowly	Excess sodium, erodes easily, droughty
130B:							
Busby-----------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing	Soil blowing	Too arid
Twilight--------	Severe: seepage	Severe: thin layer, piping	Severe: no water	Deep to water	Soil blowing, depth to rock, slope	Depth to rock soil blowing	Depth to rock, too arid
131C:							
Delpoint--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
131C: (cont.)							
Yamacall--------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
132B:							
Twilight--------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Depth to rock, soil blowing	Too arid, depth to rock
Blacksheep------	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Depth to rock, soil blowing	Too arid, depth to rock
138B:							
Zatoville-------	Moderate: slope	Moderate: excess salt	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Orinoco---------	Moderate: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Too arid, erodes easily, depth to rock
140B:							
Kobase----------	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Megonot---------	Moderate: depth to rock, slope	Moderate: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Too arid, erodes easily, depth to rock
140C:							
Kobase----------	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Megonot---------	Moderate: depth to rock, slope	Moderate: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Too arid, erodes easily, depth to rock
142A:							
Rothiemay-------	Slight	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Too arid, erodes easily
142B:							
Rothiemay-------	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
142C:							
Rothiemay-------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Slope, erodes easily	Too arid, slope, erodes easily
Crago-----------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
152A:							
Eapa------------	Moderate: seepage	Moderate: piping	Severe: no water	Deep to water	Favorable	Favorable	Too arid

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
152A:							
Attewan---------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, erodes easily	Erodes easily, too sandy	Too arid, erodes easily, droughty
153C:							
Tanna-----------	Moderate: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Depth to rock, erodes easily, percs slowly	Too arid, erodes easily, depth to rock
Cabbart---------	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
153D:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Tanna-----------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
154C:							
Marmarth--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Depth to rock, soil blowing	Too arid, depth to rock
Cabbart---------	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
154D:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Marmarth--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock
158A:							
Ethridge--------	Slight	Moderate: piping	Severe: no water	Deep to water	Percs slowly, erodes easily	Erodes easily, percs slowly	Too arid, erodes easily, percs slowly
Verson----------	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty, percs slowly, erodes easily	Erodes easily	Too arid, erodes easily, droughty
167D:							
Yawdim----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Orinoco---------	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
167E:							
Yawdim----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Orinoco---------	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
181D:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Crago-----------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
181E:							
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Crago-----------	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, too sandy	Slope, droughty
Delpoint--------	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
189C:							
Rentsac---------	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
Cabbart---------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
189E:							
Rentsac---------	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
Rock outcrop.							
230C:							
Macar-----------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
232E:							
Hughesville-----	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
232E:(cont.)							
Tibs------------	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, percs slowly	Large stones, slope, droughty
Whitecow--------	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
234F:							
Tibs------------	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, percs slowly	Large stones, slope, droughty
Whitecow--------	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
240E:							
Ridge-----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Slope, depth to rock
Dast------------	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Slope, depth to rock
Rock outcrop.							
241E:							
Twilight--------	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock
Blacksheep------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock
Rock outcrop.							
242D:							
Dast------------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Depth to rock, soil blowing	Depth to rock
Ridge-----------	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Depth to rock, soil blowing	Depth to rock
242F:							
Ridge-----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Slope, depth to rock
Dast------------	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Slope, depth to rock
243F:							
Blacksheep------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
243F:(cont.)							
Twilight--------	Severe: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, soil blowing, depth to rock	Slope, depth to rock, soil blowing	Too arid, slope, depth to rock
245C:							
Lamedeer--------	Moderate: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Favorable	Droughty
Ringling--------	Severe: seepage	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones	Large stones, droughty, rooting depth
245F:							
Lamedeer--------	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Ringling--------	Severe: seepage, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
246F:							
Lamedeer--------	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Ringling--------	Severe: seepage, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
250E:							
Macmeal---------	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
Rock outcrop.							
251C:							
Savage----------	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Erodes easily, percs slowly
252D:							
Hilger----------	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
Rock outcrop.							
252E:							
Hilger----------	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
254C:							
Fergus----------	Moderate: slope	Moderate: piping	Severe: no water	Deep to water	Slope	Erodes easily	Erodes easily
255C:							
Shambo----------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
255C: (cont.)							
Korchea----------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
Barvon----------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Erodes easily, depth to rock
255D:							
Barvon----------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Erodes easily, depth to rock
Cabba-----------	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Shambo----------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
256C:							
Yamacall--------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
Havre-----------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
Delpoint--------	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
260F:							
Kuro------------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Wayden----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Rock outcrop.							
261F:							
Wayden----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Castner---------	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
262E:							
Wayden----------	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
262E:(cont.)							
Windham	Moderate: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones	Large stones, droughty
280D:							
Cabbart	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
280E:							
Castner	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
Kuro	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
281D:							
Doney	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Cabba	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Macar	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
281E:							
Castner	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
Rock outcrop.							
282D:							
Castner	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
283D:							
Barvon	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Erodes easily, depth to rock
Cabba	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Erodes easily, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
283F:							
Cabba	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Rock outcrop.							
284D:							
Cabba	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Barvon	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Erodes easily, depth to rock
284F:							
Doney	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Wayden	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
285D:							
Cabba	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Doney	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Erodes easily, depth to rock
285F:							
Cabba	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Doney	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
286F:							
Cabbart	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Rock outcrop.							
287D:							
Delpoint	Moderate: seepage, depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
287D: (cont.)							
Cabbart	Severe: depth to rock	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Depth to rock, erodes easily	Too arid, erodes easily, depth to rock
287F:							
Cabbart	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
288D:							
Delpoint	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Cabbart	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Havre	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Too arid, erodes easily
288F:							
Cabbart	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
Delpoint	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Too arid, slope, erodes easily
289D:							
Barvon	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Cabba	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Korchea	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
289F:							
Cabba	Severe: depth to rock, slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Barvon	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope, depth to rock, erodes easily	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
291C:							
Windham----------	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
292A:							
Straw------------	Severe: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Erodes easily
Korchea----------	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Erodes easily	Erodes easily	Erodes easily
294C:							
Shambo-----------	Moderate: seepage, slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
295F:							
Bitton-----------	Severe: seepage, slope	Moderate: seepage	Severe: no water	Deep to water	Slope	Slope	Slope
Winifred---------	Severe: slope	Moderate: thin layer, hard to pack	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
Castner----------	Severe: depth to rock, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
296D:							
Borky------------	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty
Sinnigam---------	Severe: depth to rock, slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, depth to rock	Large stones, slope, droughty

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

The table "Engineering Index Properties" gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986) and the Unified soil classification system (ASTM, 1993).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

The tables "Physical Properties of the Soils" and "Chemical Properties of the Soils" show estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

The following paragraphs describe the columns in the table "Physical Properties of the Soils."

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In the table "Physical Properties of the Soils," the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table "Physical Properties of Soils," the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (up to 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams that have more than 5 percent finely divided calcium carbonate. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils have less than 5 percent finely divided calcium carbonate. They are moderately erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils have less than 5 percent finely divided calcium carbonate. They are moderately erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils have less than 5 percent finely divided calcium carbonate. They are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of rock fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to soil blowing, or the tons per acre per year that can be expected to be lost to soil blowing. There is a close correlation between soil blowing and the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence soil blowing.

The following paragraphs describe the columns in the table "Chemical Properties of the Soils."

Cation-exchange capacity is the total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. Soils having a high cation-exchange capacity can retain cations. The ability to retain cations helps to prevent the pollution of ground water.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the soil. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is given as the percent, by weight, of hydrated calcium sulfates in the soil. Gypsum is partially soluble in water and can be dissolved and removed by water. Soils that have a high content of gypsum (more than 10 percent) may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio is the measure of sodium relative to calcium and magnesium in the water extract from saturated soil paste. Soils having a sodium adsorption ratio of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

The table "Water Features" gives estimates of several important water features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Hydrologic soil groups are groups of soils that, when saturated, have the same runoff potential under similar storm and ground cover conditions. The soil properties that affect the runoff potential are those that influence the minimum rate of infiltration in a bare soil after prolonged wetting and when the soil is not frozen. These properties include the depth to a seasonal high water table, the intake rate, permeability after prolonged wetting, and the depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

In the definitions of the hydrologic soil groups, the infiltration rate is the rate at which water enters the soil at the surface and is controlled by surface conditions. The transmission rate is the rate at which water moves through the soil and is controlled by properties of the soil layers.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of very deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding.

The table "Water Features" gives the frequency and duration of flooding and the time of year when flooding is most likely to occur. Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). The term *common* includes both frequent and occasional flooding.

Duration is expressed as *very brief* (less than 2 days), *brief (2 to 7 days), long* (7 to 30 days), and *very long* (more than 30 days). The time of year that flooding is most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is a zone of saturation at the highest average depth during the wettest season. It is at least 6 inches thick, persists in the soil for more than a few weeks, and is within 6 feet of the surface. Indicated in the table "Water Features" are depth to the seasonal high water table, the kind of water table, and the months of the year when the water table usually is highest.

An *apparent* water table is indicated by the level at which water stands in a freshly dug, unlined borehole after adequate time is allowed for adjustments in the surrounding soil.

A *perched* water table is one that is above an unsaturated zone in the soil. The basis for determining that a water table is perched may be general knowledge of the area. The water table is proven to be perched if the water level in a borehole is observed to fall when the borehole is extended.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation.

Soil Features

The table "Soil Features" gives estimates of several important soil features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Depth to bedrock is given if bedrock is within a depth of 60 inches. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A *cemented pan* is a nearly continuous layer of indurated or strongly cemented material that is hard and brittle. The particles are held together by cementing substances, such as calcium carbonate and oxides of silicon, iron, or aluminum. Pans are identified when they are within a depth of 60 inches. They are classified as thin or thick. A *thin* pan can be excavated by trenching machines, backhoes, small rippers, and other equipment commonly used to dig excavations for pipelines, sewer lines, and graves. A *thick* pan is so thick or massive that blasting or special equipment is needed when excavations are made.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a *moderate* potential indicates that the soil is susceptible to the formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength; and a *high* potential indicates that the soil is highly susceptible to the formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil.

Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Properties

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1E:												
Badland.												
2E:												
Rock outcrop.												
3A:												
Riverwash.												
5A:												
Harlake---------	0-5	Silty clay	CL, CH	A-7	0	0	100	100	90-100	75-90	40-65	20-40
	5-60	Stratified clay to silt loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-70	15-45
6A:												
Harlake---------	0-5	Silty clay	CH, CL	A-7	0	0	100	100	90-100	75-95	40-65	20-40
	5-60	Stratified clay to silt loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-65	20-40
7A:												
Lostriver-------	0-3	Silty clay	CL, CH	A-7	0	0	100	100	85-100	75-95	40-60	20-40
	3-7	Stratified clay loam to clay	CL, CH	A-7, A-6	0	0	100	100	90-100	70-95	35-60	15-40
	7-60	Stratified clay loam to clay	CL, CH	A-7, A-6	0	0	100	100	90-100	70-95	35-60	15-40
7B:												
Lostriver-------	0-3	Silty clay	CL, CH	A-7	0	0	100	100	85-100	75-95	40-60	20-40
	3-7	Stratified clay loam to clay	CL, CH	A-7, A-6	0	0	100	100	90-100	70-95	35-60	15-40
	7-60	Stratified clay loam to clay	CL, CH	A-7, A-6	0	0	100	100	90-100	70-95	35-60	15-40
Bullhook--------	0-5	Loam	CL-ML	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	5-11	Stratified fine sandy loam to clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	70-100	50-80	20-35	5-15
	11-60	Stratified fine sandy loam to clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	70-100	50-80	20-35	5-15
8A:												
Harlake---------	0-5	Silty clay	CH, CL	A-7	0	0	100	100	90-100	75-95	40-65	20-40
	5-60	Stratified clay to silt loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-65	20-40
Havre-----------	0-6	Loam	ML, CL-ML	A-4	0	0	100	100	80-95	60-75	20-30	NP-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	50-70	20-35	5-15
8B:												
Harlake---------	0-5	Silty clay	CL, CH	A-7	0	0	100	100	90-100	75-90	40-65	20-40
	5-60	Stratified clay to silt loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-70	15-45
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
9A:												
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
9B:												
Havre-----------	0-6	Loam	ML, CL-ML	A-4	0	0	100	100	80-95	60-75	20-30	NP-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	50-70	20-35	5-15
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
10A:												
Havre-----------	0-6	Loam	ML, CL-ML	A-4	0	0	100	100	80-95	60-75	20-30	NP-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	50-70	20-35	5-15
11A:												
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
Glendive--------	0-8	Fine sandy loam	SM, ML	A-2, A-4	0	0	100	100	65-85	30-55	15-20	NP-5
	8-14	Loam, silt loam, sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	0	100	100	65-95	40-70	15-25	NP-10
	14-60	Stratified loamy fine sand to clay loam	SM, SC-SM	A-2, A-4	0	0	95-100	75-100	60-90	25-50	15-25	NP-10
11B:												
Havre-----------	0-6	Loam	ML, CL-ML	A-4	0	0	100	100	80-95	60-75	20-30	NP-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	50-70	20-35	5-15
Glendive--------	0-8	Fine sandy loam	SM, ML, SC-SM, CL-ML	A-4, A-2	0	0	100	100	65-85	30-55	20-30	NP-10
	8-14	Loam, silt loam, sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	0	100	100	65-95	40-70	15-30	NP-10
	14-60	Stratified loamy fine sand to silt loam	SM, SC-SM	A-2, A-4	0	0	95-100	75-100	60-80	25-50	15-25	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
12A:												
Havre-----------	0-6	Loam	ML, CL-ML	A-4	0	0	100	100	80-95	60-75	20-30	NP-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	50-70	20-35	5-15
Harlake---------	0-5	Silty clay	CH	A-7	0	0	100	100	95-100	90-95	50-70	25-40
	5-15	Stratified loam to silty clay	CH	A-7	0	0	100	100	95-100	80-95	50-70	25-40
	15-60	Stratified silt loam to clay	CH	A-7	0	0	100	100	95-100	80-95	50-70	25-40
13A:												
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
14A:												
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
Glendive--------	0-8	Fine sandy loam	SM, ML	A-2, A-4	0	0	100	100	65-85	30-55	15-20	NP-5
	8-14	Loam, silt loam, sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	0	100	100	65-95	40-70	15-25	NP-10
	14-60	Stratified loamy fine sand to clay loam	SM, SC-SM	A-2, A-4	0	0	95-100	75-100	60-90	25-50	15-25	NP-10
14B:												
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
Glendive--------	0-8	Fine sandy loam	SM, ML, SC-SM, CL-ML	A-4, A-2	0	0	100	100	65-85	30-55	20-30	NP-10
	8-14	Loam, silt loam, sandy loam	ML, CL-ML, SM, SC-SM	A-4	0	0	100	100	65-95	40-70	15-30	NP-10
	14-60	Stratified loamy fine sand to silt loam	SM, SC-SM	A-2, A-4	0	0	95-100	75-100	60-80	25-50	15-25	NP-10
15A:												
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
Harlake---------	0-5	Silty clay	CL	A-6, A-7	0	0	100	100	95-100	90-95	30-50	15-30
	5-60	Stratified clay to silt loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-70	15-45

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
16A:												
Havre-----------	0-4	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	4-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
Yamacall--------	0-5	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	55-75	25-30	5-10
	5-28	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	28-60	Loam, fine sandy loam, silt loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
17A:												
Harlake---------	0-5	Silty clay	CL	A-6, A-7	0	0	100	100	95-100	90-95	30-50	15-30
	5-60	Stratified clay to silt loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-70	15-45
Havre-----------	0-6	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	6-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
20B:												
Harlake---------	0-5	Silty clay	CH, CL	A-7	0	0	100	100	90-100	75-95	40-65	20-40
	5-60	Stratified clay to silt loam	CL, CH	A-7	0	0	100	100	95-100	85-95	40-65	20-40
Marvan----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	85-100	40-65	20-45
	2-17	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	17-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
Vanda-----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	2-12	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
	12-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
21A:												
McKenzie--------	0-4	Silty clay	CH	A-7	0	0	100	100	90-100	75-95	50-75	25-50
	4-25	Clay, silty clay	CH	A-7	0	0	100	100	95-100	75-95	50-75	25-50
	25-60	Clay, silty clay	CH	A-7	0	0	100	100	95-100	75-95	50-75	25-50
22B:												
Nobe------------	0-1	Silty clay loam	CL	A-6	0	0	100	100	90-100	70-90	30-40	10-20
	1-60	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-35

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
22B: (cont.)												
Absher----------	0-1	Silty clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-35
	1-6	Silty clay, clay, clay loam	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-60	20-40
	6-60	Clay loam, clay, silty clay	CL, CH	A-7	0	0	95-100	75-100	70-100	60-95	40-55	20-35
23A:												
Gerdrum---------	0-3	Loam	CL-ML	A-4	0	0	80-100	75-100	60-90	50-80	25-30	5-10
	3-10	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	10-23	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	23-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35
Vanda-----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	2-12	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
23B:												
Gerdrum---------	0-3	Loam	CL-ML	A-4	0	0	80-100	75-100	60-90	50-80	25-30	5-10
	3-10	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	10-23	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	23-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35
Vanda-----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	2-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
Creed-----------	0-5	Loam	CL-ML, SC-SM	A-4	0	0	90-100	75-100	65-95	45-75	20-30	5-10
	5-10	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	90-100	75-100	70-100	60-95	35-60	15-35
	10-35	Silty clay loam, clay loam, clay	CL, SC	A-6, A-7	0	0	90-100	75-100	60-100	35-90	30-50	15-25
	35-60	Stratified loam to silty clay loam	CL	A-6, A-7	0	0	90-100	75-100	65-100	50-90	30-45	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
23C:												
Gerdrum---------	0-3	Loam	CL-ML	A-4	0	0	80-100	75-100	60-90	50-80	25-30	5-10
	3-10	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	10-23	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	23-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35
Creed-----------	0-5	Loam	CL-ML, SC-SM	A-4	0	0	90-100	75-100	65-95	45-75	20-30	5-10
	5-10	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	90-100	75-100	70-100	60-95	35-60	15-35
	10-35	Silty clay loam, clay loam, clay	CL, SC	A-6, A-7	0	0	90-100	75-100	60-100	35-90	30-50	15-25
	35-60	Stratified loam to silty clay loam	CL	A-6, A-7	0	0	90-100	75-100	65-100	50-90	30-45	10-20
25A:												
Vanda-----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	2-12	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
	12-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
26A:												
Weingart--------	0-2	Loam	CL-ML	A-4	0	0	90-100	90-100	65-90	60-85	25-30	5-10
	2-14	Clay, silty clay	CL, CH	A-7	0	0	90-100	90-100	80-100	75-95	40-65	20-40
	14-21	Clay, silty clay, clay loam	CL, CH	A-6, A-7	0	0	90-100	90-100	75-100	70-90	35-60	15-35
	21-32	Shaly clay, silty clay, clay loam	CL, CH, SC, GC	A-6, A-7	0	0	60-95	55-90	50-85	45-80	35-60	15-35
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
26B:												
Weingart--------	0-2	Loam	CL-ML	A-4	0	0	90-100	90-100	65-90	60-85	25-30	5-10
	2-14	Clay, silty clay	CL, CH	A-7	0	0	90-100	90-100	80-100	75-95	40-65	20-40
	14-21	Clay, silty clay, clay loam	CL, CH	A-6, A-7	0	0	90-100	90-100	75-100	70-90	35-60	15-35
	21-32	Shaly clay, silty clay, clay loam	CL, CH, SC, GC	A-6, A-7	0	0	60-95	55-90	50-85	45-80	35-60	15-35
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
26B: (cont.)												
Warhorse--------	0-3	Loam	CL, CL-ML	A-4, A-6	0	0-10	90-100	85-100	70-95	50-75	25-35	5-15
	3-12	Clay loam, silty clay loam, silty clay	CL	A-6, A-7	0	0	90-100	85-100	75-100	60-95	35-45	15-25
	12-16	Clay loam, silty clay loam, silty clay	CL	A-6, A-7	0	0	90-100	85-100	75-100	60-95	30-45	10-25
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
30C:												
Busby-----------	0-6	Fine sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	6-13	Fine sandy loam, sandy loam, loam	SM, ML	A-4	0	0	100	100	60-90	35-75	20-25	NP-5
	13-43	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	43-60	Loamy fine sand, loamy sand, fine sandy loam	SM	A-2, A-4	0	0	100	100	60-85	20-50	15-25	NP-5
30D:												
Busby-----------	0-6	Fine sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	6-13	Fine sandy loam, sandy loam, loam	SM, ML	A-4	0	0	100	100	60-90	35-75	20-25	NP-5
	13-43	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	43-60	Loamy fine sand, loamy sand, fine sandy loam	SM	A-2, A-4	0	0	100	100	60-85	20-50	15-25	NP-5
31B:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
31C:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
31C:(cont.)												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock			0	0	0	0	0	0	---	NP
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
32B:												
Twilight--------	0-3	Sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	3-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	11-35	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
32D:												
Twilight--------	0-3	Sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	3-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	11-35	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Blacksheep------	0-4	Sandy loam	SM, ML	A-4	0	0	100	100	65-85	40-60	15-20	NP-5
	4-18	Fine sandy loam, sandy loam, very fine sandy loam	SM, ML	A-4	0	0	100	90-100	65-85	35-60	15-20	NP-5
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
33A:												
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
33B:												
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
34A:												
Yamacall--------	0-7	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	7-14	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	14-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
34B:												
Yamacall--------	0-7	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	7-14	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	14-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
35B:												
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
Busby-----------	0-6	Fine sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	6-13	Fine sandy loam, sandy loam, loam	SM, ML	A-4	0	0	100	100	60-90	35-75	20-25	NP-5
	13-43	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-85	35-50	20-25	NP-5
	43-60	Loamy fine sand, loamy sand, fine sandy loam	SM	A-2, A-4	0	0	100	100	60-85	20-50	15-25	NP-5
36B:												
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
36B:(cont.)												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
37A:												
Yamacall--------	0-7	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	7-14	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	14-60	Loam, fine sandy loam, silt loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
37B:												
Yamacall--------	0-7	Clay loam	CL	A-6	0	0-5	85-100	80-100	65-90	60-80	30-35	10-15
	7-14	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	14-60	Loam, fine sandy loam, silt loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
38A:												
Kobase----------	0-6	Silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	85-100	80-95	30-45	10-20
	6-24	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
	24-60	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
Zatoville-------	0-2	Silty clay loam	CL	A-6	0	0	100	100	90-100	85-100	30-40	10-20
	2-13	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25
	13-19	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25
	19-60	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25
38B:												
Zatoville-------	0-2	Silty clay loam	CL	A-6	0	0	100	100	90-100	85-100	30-40	10-20
	2-13	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25
	13-19	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25
	19-60	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
39B:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	90-100	85-100	75-90	60-80	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
39C:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	90-100	85-100	75-90	60-80	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
40B:												
Kobase----------	0-6	Silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	85-100	80-95	30-45	10-20
	6-24	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
	24-60	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
40C:												
Kobase----------	0-6	Silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	85-100	80-95	30-45	10-20
	6-24	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-45	15-25
	24-60	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-45	15-25
41A:												
Yamacall--------	0-5	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	55-75	25-30	5-10
	5-28	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	28-60	Loam, fine sandy loam, silt loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
41B:												
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	55-75	25-30	5-10
	3-25	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	25-60	Loam, fine sandy loam, silt loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
41C:												
Yamacall--------	0-5	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	55-75	25-30	5-10
	5-28	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
	28-60	Loam, fine sandy loam, silt loam	CL-ML, SM	A-4, A-2	0	0-5	75-100	70-100	50-80	25-55	15-25	NP-10
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-10	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	65-85	20-40	5-20
	10-22	Loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	90-100	85-100	75-90	60-80	20-40	5-20
	22-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
50B:												
Hinterland------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	60-80	25-30	5-10
	3-12	Channery clay loam, gravelly clay, channery clay	CL, SC, GC	A-6, A-7	0	0-10	60-85	55-80	50-70	45-65	30-45	10-25
	12-22	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
50C:												
Hinterland------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	60-80	25-30	5-10
	3-12	Channery clay loam, gravelly clay, channery clay	CL, SC, GC	A-6, A-7	0	0-10	60-85	55-80	50-70	45-65	30-45	10-25
	12-22	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
50D:												
Hinterland------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	65-85	60-80	25-30	5-10
	3-12	Channery clay loam, gravelly clay, channery clay	CL, SC, GC	A-6, A-7	0	0-10	60-85	55-80	50-70	45-65	30-45	10-25
	12-22	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
50D:(cont.)												
Delplain--------	0-3	Channery clay loam	GC, SC, CL	A-6	0	0-10	55-80	50-70	40-60	35-55	30-40	10-20
	3-12	Very channery clay loam, very channery clay, extremely channery clay loam	GC, GP-GC	A-2	0	0-10	20-55	10-45	5-40	5-30	35-50	15-25
	12-22	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
51A:												
Ethridge--------	0-6	Clay loam	CL	A-6	0	0	100	95-100	85-100	70-80	25-40	10-20
	6-14	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	14-25	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30
	25-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
51B:												
Ethridge--------	0-6	Clay loam	CL	A-6	0	0	100	95-100	85-100	70-80	25-40	10-20
	6-14	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	14-25	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30
	25-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
52A:												
Eapa------------	0-5	Loam	CL, ML	A-4, A-6, A-7	0	0-5	95-100	85-100	80-95	55-85	30-45	7-20
	5-15	Clay loam, loam	CL, ML	A-6, A-7	0	0-5	95-100	85-100	75-95	55-85	35-50	10-25
	15-32	Loam, sandy clay loam, clay loam	CL	A-4, A-6, A-7	0	0-5	95-100	85-100	75-95	55-85	30-45	8-20
	32-60	Loam, clay loam	CL	A-4, A-6, A-7	0	0-5	95-100	80-100	75-95	50-80	30-45	8-20
52B:												
Eapa------------	0-5	Loam	CL, ML	A-4, A-6, A-7	0	0-5	95-100	85-100	80-95	55-85	30-45	7-20
	5-15	Clay loam, loam	CL, ML	A-6, A-7	0	0-5	95-100	85-100	75-95	55-85	35-50	10-25
	15-32	Loam, sandy clay loam, clay loam	CL	A-4, A-6, A-7	0	0-5	95-100	85-100	75-95	55-85	30-45	8-20
	32-60	Loam, clay loam	CL	A-4, A-6, A-7	0	0-5	95-100	80-100	75-95	50-80	30-45	8-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
53A:												
Tanna	0-4	Loam	CL-ML	A-4	0	0-5	90-100	90-100	85-95	70-80	25-30	5-10
	4-12	Clay loam, clay, silty clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-95	75-90	35-45	15-25
	12-25	Very channery loam, channery clay loam, clay loam	GM-GC, CL-ML, CL	A-2, A-4, A-6	0	0-10	40-100	30-95	25-80	20-70	25-40	5-15
	25-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
54A:												
Marmarth	0-4	Fine sandy loam	SM, SC-SM	A-2, A-4	0	0	100	100	60-75	30-45	20-25	NP-5
	4-8	Clay loam, loam, sandy clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	60-80	25-40	5-20
	8-31	Loam, fine sandy loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	60-80	25-35	5-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
56A:												
Crago	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
Musselshell	0-4	Loam	CL-ML	A-4	0	0-10	90-100	85-100	60-80	55-75	25-30	5-10
	4-20	Gravelly loam, loam	CL-ML, GM, GM-GC, ML	A-4	0	0-15	65-100	60-100	45-80	40-70	15-25	NP-10
	20-60	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	40-60	30-55	25-45	10-30	15-25	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
56A: (cont.)												
Attewan---------	0-5	Loam	ML, CL-ML	A-4	0	0-5	85-100	80-100	70-90	55-75	20-30	NP-10
	5-14	Clay loam, sandy clay loam, gravelly loam	CL, SC	A-6	0	0-5	75-100	70-100	55-85	35-70	30-40	10-20
	14-26	Clay loam, gravelly loam, sandy clay loam	CL, SC, GC	A-6	0	0-5	70-100	65-100	50-85	35-65	30-40	10-20
	26-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP-GM, GM, SM	A-1	0	0-15	25-55	15-50	5-20	0-15	---	NP
57A:												
Attewan---------	0-5	Loam	ML, CL-ML	A-4	0	0-5	85-100	80-100	70-90	55-75	20-30	NP-10
	5-14	Clay loam, sandy clay loam, gravelly loam	CL, SC	A-6	0	0-5	75-100	70-100	55-85	35-70	30-40	10-20
	14-26	Clay loam, gravelly loam, sandy clay loam	CL, SC, GC	A-6	0	0-5	70-100	65-100	50-85	35-65	30-40	10-20
	26-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP-GM, GM, SM	A-1	0	0-15	25-55	15-50	5-20	0-15	---	NP
57B:												
Attewan---------	0-2	Cobbly loam	CL-ML, GM-GC, SC-SM	A-4	0	15-25	70-95	65-90	55-85	40-70	20-30	5-10
	2-14	Clay loam, sandy clay loam, gravelly loam	CL-ML, CL, SC-SM, SC	A-4, A-6, A-2	0	0-10	70-90	65-85	50-85	25-70	25-40	5-15
	14-26	Clay loam, gravelly loam, silt loam	CL-ML, CL, GM-GC, SC-SM	A-4, A-6	0	0-10	65-90	60-85	50-85	35-75	20-35	5-15
	26-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP-GM, GM	A-1	0	0-25	20-55	15-50	10-40	0-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
57C:												
Attewan	0-5	Loam	ML, CL-ML	A-4	0	0-5	85-100	80-100	70-90	55-75	20-30	NP-10
	5-14	Clay loam, sandy clay loam, gravelly loam	CL, SC	A-6	0	0-5	75-100	70-100	55-85	35-70	30-40	10-20
	14-26	Clay loam, gravelly loam, sandy clay loam	CL, SC, GC	A-6	0	0-5	70-100	65-100	50-85	35-65	30-40	10-20
	26-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP-GM, GM, SM	A-1	0	0-15	25-55	15-50	5-20	0-15	---	NP
Niart	0-6	Loam	CL-ML, ML	A-4	0	0	95-100	90-95	75-85	65-75	20-30	NP-10
	6-24	Loam, clay loam, gravelly loam	CL-ML	A-4	0	0-10	75-90	65-80	60-75	55-65	20-30	5-10
	24-60	Very gravelly loam, very gravelly sandy clay loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	25-65	15-55	15-40	10-30	20-30	NP-10
58A:												
Verson	0-4	Clay loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	60-90	50-75	25-40	5-15
	4-9	Silty clay loam, clay loam, clay	CL, CH	A-6, A-7	0	0-5	90-100	85-100	70-95	65-90	35-55	15-30
	9-22	Silty clay loam, clay, gravelly clay loam	CL	A-6, A-7	0	0-10	80-100	70-100	60-95	55-85	35-50	15-25
	22-60	Very gravelly sandy loam, very gravelly loam, extremely gravelly loam	GM, GP-GM	A-1	0	10-15	20-50	15-40	10-30	5-25	20-25	NP-5
60B:												
Abor	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-32	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
60C:												
Abor	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-32	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
60C: (cont.)												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-6	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	6-14	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	14-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
60D:												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-6	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	6-14	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	14-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Abor------------	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-32	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
60E:												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-6	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	6-14	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	14-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Abor------------	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-32	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
61D:												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-5	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	5-11	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	11-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Neldore, saline-	0-4	Silty clay	CL, CH	A-7	0	0	100	100	95-100	85-100	45-65	25-45
	4-18	Silty clay, clay	CL, CH	A-7	0	0	100	100	95-100	80-95	45-65	25-45
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
61E:												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-5	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	5-11	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	11-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Volborg---------	0-3	Silty clay	CL	A-7	0	0	100	100	95-100	80-95	40-50	20-30
	3-17	Silty clay, silty clay loam, clay	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	15-30
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
62C:												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-6	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	6-14	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	14-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
62D:												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-5	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	5-11	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	11-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Yawdim----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	80-95	40-55	20-35
	2-11	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
62E:												
Neldore---------	0-3	Silty clay	CL, CH	A-7	0	0-10	95-100	90-100	75-100	70-95	40-55	20-30
	3-5	Clay, silty clay	CL, CH	A-7	0	0	90-100	85-100	70-95	65-90	40-60	20-40
	5-11	Clay, silty clay	CL, CH	A-7	0	0-5	85-100	80-100	65-95	60-90	40-60	20-40
	11-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
63A:												
Marias----------	0-4	Silty clay	CL, CH	A-7	0	0	100	100	95-100	90-95	40-60	20-40
	4-28	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50
	28-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-95	40-70	25-50

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
64A:												
Marvan----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	85-100	40-65	20-45
	2-17	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	17-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
Vanda-----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	75-95	40-65	20-45
	2-12	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
	12-60	Clay, silty clay, silty clay loam	CL, CH	A-7, A-6	0	0	100	100	95-100	80-95	35-65	15-45
64B:												
Marvan----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	85-100	40-65	20-45
	2-17	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
	17-60	Clay, silty clay	CL, CH	A-7	0	0	100	100	90-100	75-100	45-70	25-50
67D:												
Yawdim----------	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-11	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
68C:												
Megonot---------	0-10	Silty clay loam	CL	A-6, A-7	0	0	95-100	85-100	85-100	75-100	35-45	15-25
	10-18	Silty clay loam, clay loam, silty clay	CL	A-6, A-7	0	0	85-100	75-100	75-90	65-90	35-45	15-25
	18-35	Silty clay loam, clay loam, shaly silty clay	CL, GC	A-6, A-7	0	0	65-100	55-100	45-90	40-90	35-45	15-25
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Yawdim----------	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-16	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
69C:												
Orinoco---------	0-3	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	3-16	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	16-24	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
69C: (cont.)												
Yawdim----------	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-16	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
73D:												
Yawdim----------	0-2	Silty clay loam	CL	A-7, A-6	0	0	100	100	95-100	80-90	30-45	10-20
	2-16	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Abor------------	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-32	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
73E:												
Yawdim----------	0-2	Silty clay	CL, CH	A-7	0	0	100	100	95-100	80-95	40-55	20-35
	2-11	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Abor------------	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-27	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	27-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
74D:												
Abor------------	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-32	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	32-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
74D:(cont.)												
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
74E:												
Abor------------	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-27	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	27-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
80E:												
Blacksheep------	0-4	Sandy loam	SM, ML	A-4	0	0	100	100	65-85	40-60	15-20	NP-5
	4-18	Fine sandy loam, sandy loam, very fine sandy loam	SM, ML	A-4	0	0	100	90-100	65-85	35-60	15-20	NP-5
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
Twilight--------	0-3	Sandy loam	SM, SC-SM	A-4	0	0	100	100	75-90	35-50	15-30	NP-7
	3-11	Fine sandy loam, sandy loam	SM, SC-SM	A-4	0	0	100	100	75-90	35-50	15-30	NP-7
	11-35	Fine sandy loam, sandy loam, loamy fine sand	SM	A-2, A-4	0	0	100	100	60-90	25-50	0-30	NP-5
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
81B:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
81C:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
81D:												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
82B:												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
82C:												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
82E:												
Cabbart---------	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
82E: (cont.)												
Delpoint	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-11	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	11-22	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	22-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
83D:												
Cabbart	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
Blacksheep	0-4	Fine sandy loam	SM, ML	A-4	0	0	100	100	65-85	40-60	15-20	NP-5
	4-18	Fine sandy loam, sandy loam, very fine sandy loam	SM, ML	A-4	0	0	100	90-100	65-85	35-60	15-20	NP-5
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
84C:												
Cabbart	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Yawdim	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-16	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Delpoint	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
84D:												
Cabbart---------	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Yawdim----------	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-11	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
84E:												
Cabbart---------	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Yawdim----------	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-11	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-11	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	11-22	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	22-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
85A:												
Cabbart---------	0-4	Clay loam	CL	A-6	0	0	90-100	85-100	70-90	60-80	30-35	10-15
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
86D:												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
86D: (cont.)												
Rentsac---------	0-2	Fine sandy loam	SM	A-2, A-4	0	0-10	90-100	85-100	60-85	30-50	20-25	NP-5
	2-12	Very cobbly loam, extremely flaggy loam, very channery sandy loam	GM	A-1, A-2	0	15-45	35-60	30-55	25-45	15-35	20-25	NP-5
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
86E:												
Cabbart---------	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
87B:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-11	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	65-85	20-40	5-20
	11-22	Loam, clay loam, silt loam	CL-ML, CL	A-4, A-6	0	0	90-100	85-100	75-90	60-80	20-40	5-20
	22-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
88D:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart---------	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
89C:												
Rentsac---------	0-2	Fine sandy loam	SM	A-2, A-4	0	0-10	90-100	85-100	60-85	30-50	20-25	NP-5
	2-12	Very cobbly loam, extremely flaggy loam, very channery sandy loam	GM	A-1, A-2	0-5	15-40	35-60	30-55	25-45	15-35	20-25	NP-5
	12-22	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
90B:												
Chinook---------	0-4	Fine sandy loam	SM	A-4, A-2	0	0	80-100	75-100	65-85	30-50	15-25	NP-5
	4-34	Fine sandy loam, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	55-85	30-50	15-25	NP-5
	34-60	Fine sandy loam, sandy loam	SM	A-4, A-2	0	0	80-100	75-100	55-85	30-50	15-25	NP-5
91A:												
Kremlin---------	0-6	Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	50-75	25-30	5-10
	6-15	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	75-95	55-80	25-35	5-15
	15-60	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	75-95	55-80	25-35	5-15
91B:												
Kremlin---------	0-6	Loam	CL-ML	A-4	0	0	95-100	90-100	75-95	50-75	25-30	5-10
	6-15	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	75-95	55-80	25-35	5-15
	15-60	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	75-95	55-80	25-35	5-15
92A:												
Binna-----------	0-6	Loam	CL-ML	A-4	0	0-5	95-100	90-100	75-95	60-80	20-30	5-10
	6-25	Loam, gravelly loam, gravelly sandy loam	SC-SM, GM-GC, CL-ML	A-4, A-2	0	0-15	70-100	65-100	45-75	30-65	20-30	5-10
	25-60	Very gravelly loamy sand	GM, SM	A-1	0	0-15	40-60	30-50	15-35	10-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
93A:												
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
Musselshell-----	0-4	Loam	CL-ML	A-4	0	0-10	90-100	85-100	60-80	55-75	25-30	5-10
	4-20	Gravelly loam, loam	CL-ML, GM, GM-GC, ML	A-4	0	0-15	65-100	60-100	45-80	40-70	15-25	NP-10
	20-60	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	40-60	30-55	25-45	10-30	15-25	NP-10
93B:												
Crago-----------	0-4	Cobbly loam	ML, CL-ML	A-4	0	15-30	75-85	70-80	60-70	50-60	20-30	NP-10
	4-10	Very stony loam, very cobbly clay loam, gravelly loam	GM-GC, GC, SC-SM, CL	A-4, A-6, A-2	0	10-45	50-80	45-75	40-70	30-60	25-35	5-15
	10-21	Very cobbly loam, extremely cobbly sandy loam, very gravelly clay loam	GM, GM-GC	A-2, A-1	0	25-55	30-50	25-45	20-40	15-35	20-30	NP-10
	21-60	Very cobbly sandy loam, extremely cobbly loamy sand, very gravelly sandy loam	GM	A-1	0	25-55	35-55	25-45	15-35	10-25	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
94A:												
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
94E:												
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
95A:												
Crago-----------	0-4	Cobbly loam	ML, CL-ML	A-4	5-10	10-20	75-85	70-80	60-70	50-60	20-30	NP-10
	4-10	Very stony loam, very cobbly clay loam, gravelly loam	GM-GC, GC, SC-SM, CL	A-4, A-6, A-2	0-20	10-25	50-80	45-75	40-70	30-60	25-35	5-15
	10-21	Very cobbly loam, extremely cobbly sandy loam, very gravelly clay loam	GM, GM-GC	A-2, A-1	0-5	25-50	30-50	25-45	20-40	15-35	20-30	NP-10
	21-60	Very cobbly sandy loam, extremely cobbly loamy sand, very gravelly sandy loam	GM	A-1	0-5	25-50	35-55	25-45	15-35	10-25	---	NP
Musselshell-----	0-4	Cobbly loam	CL-ML	A-4	0	15-40	85-95	80-90	60-80	55-75	25-30	5-10
	4-20	Gravelly loam, loam	CL-ML, GM, GM-GC, ML	A-4	0	0-15	65-100	60-100	45-80	40-70	15-25	NP-10
	20-60	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	40-60	30-55	25-45	10-30	15-25	NP-10
95B:												
Crago-----------	0-4	Cobbly loam	ML, CL-ML	A-4	5-10	10-20	75-85	70-80	60-70	50-60	20-30	NP-10
	4-10	Very stony loam, very cobbly clay loam, gravelly loam	GM-GC, GC, SC-SM, CL	A-4, A-6, A-2	0-20	10-25	50-80	45-75	40-70	30-60	25-35	5-15
	10-21	Very cobbly loam, extremely cobbly sandy loam, very gravelly clay loam	GM, GM-GC	A-2, A-1	0-5	25-50	30-50	25-45	20-40	15-35	20-30	NP-10
	21-60	Very cobbly sandy loam, extremely cobbly loamy sand, very gravelly sandy loam	GM	A-1	0-5	25-50	35-55	25-45	15-35	10-25	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
95B: (cont.)												
Attewan---------	0-5	Cobbly loam	CL-ML, GM-GC, SC-SM	A-4	0	15-25	70-95	65-90	55-85	40-70	25-30	5-10
	5-14	Clay loam, sandy clay loam, gravelly loam	CL-ML, CL, SC-SM, SC	A-4, A-6, A-2	0	0-10	70-90	65-85	50-85	25-70	25-35	5-15
	14-26	Clay loam, gravelly loam, silt loam	CL-ML, CL, GM-GC, SC	A-4, A-6	0	0-10	65-90	60-85	50-85	35-75	25-35	5-15
	26-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP-GM, GM	A-1	0	0-25	20-55	15-50	10-40	0-15	---	NP
Musselshell-----	0-4	Cobbly loam	CL-ML	A-4	0	15-40	85-95	80-90	60-80	55-75	25-30	5-10
	4-20	Gravelly loam, loam	CL-ML, GM, GM-GC, ML	A-4	0	0-15	65-100	60-100	45-80	40-70	15-25	NP-10
	20-60	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	40-60	30-55	25-45	10-30	15-25	NP-10
95C:												
Crago-----------	0-4	Cobbly loam	ML, CL-ML	A-4	0	15-30	75-85	70-80	60-70	50-60	20-30	NP-10
	4-10	Very stony loam, very cobbly clay loam, gravelly loam	GM-GC, GC, SC-SM, CL	A-4, A-6, A-2	0	10-45	50-80	45-75	40-70	30-60	25-35	5-15
	10-21	Very cobbly loam, extremely cobbly sandy loam, very gravelly clay loam	GM, GM-GC	A-2, A-1	0	25-55	30-50	25-45	20-40	15-35	20-30	NP-10
	21-60	Very cobbly sandy loam, extremely cobbly loamy sand, very gravelly sandy loam	GM	A-1	0	25-55	35-55	25-45	15-35	10-25	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
95C: (cont.)												
Attewan	0-5	Cobbly loam	CL-ML, GM-GC, SC-SM	A-4	0	15-25	70-95	65-90	55-85	40-70	20-30	5-10
	5-14	Clay loam, sandy clay loam, gravelly loam	CL-ML, CL, SC-SM, SC	A-4, A-6, A-2	0	0-10	70-90	65-85	50-85	25-70	25-40	5-15
	14-26	Clay loam, gravelly loam, silt loam	CL-ML, CL, GM-GC, SC-SM	A-4, A-6	0	0-10	65-90	60-85	50-85	35-75	20-35	5-15
	26-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP-GM, GM	A-1	0	0-25	20-55	15-50	10-40	0-15	---	NP
95E:												
Yawdim	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-11	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Crago	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
96E:												
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
Abor------------	0-3	Silty clay	CL, CH	A-7	0	0	95-100	90-100	80-100	75-95	40-60	20-35
	3-27	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	80-100	75-100	65-100	60-95	35-65	20-45
	27-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
97A:												
Musselshell-----	0-4	Cobbly loam	CL-ML	A-4	0	15-40	85-95	80-90	60-80	55-75	25-30	5-10
	4-20	Gravelly loam, loam	CL-ML, GM, GM-GC, ML	A-4	0	0-15	65-100	60-100	45-80	40-70	15-25	NP-10
	20-60	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	40-60	30-55	25-45	10-30	15-25	NP-10
Crago-----------	0-4	Cobbly loam	ML, CL-ML	A-4	5-10	10-20	75-85	70-80	60-70	50-60	20-30	NP-10
	4-15	Very stony loam, very cobbly clay loam, gravelly loam	GM-GC, GC, SC-SM, CL	A-4, A-6, A-2	0-20	10-25	50-80	45-75	40-70	30-60	25-35	5-15
	15-26	Very cobbly loam, extremely cobbly sandy loam, very gravelly clay loam	GM, GM-GC	A-2, A-1	0-5	25-50	30-50	25-45	20-40	15-35	20-30	NP-10
	26-60	Very cobbly sandy loam, extremely cobbly loamy sand, very gravelly sandy	GM	A-1	0-5	25-50	35-55	25-45	15-35	10-25	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
97B:												
Musselshell-----	0-4	Loam	CL-ML	A-4	0	0-10	90-100	85-100	60-80	55-75	25-30	5-10
	4-20	Gravelly loam, loam	CL-ML, GM, GM-GC, ML	A-4	0	0-15	65-100	60-100	45-80	40-70	15-25	NP-10
	20-60	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	40-60	30-55	25-45	10-30	15-25	NP-10
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-15	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	15-26	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	26-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
98A:												
Niart-----------	0-6	Cobbly loam	CL-ML, SC-SM, GM-GC	A-4	0	5-20	70-80	65-75	55-70	40-60	25-30	5-10
	6-24	Loam, clay loam, gravelly loam	CL-ML	A-4	0	0-10	75-90	65-80	60-75	55-65	20-30	5-10
	24-60	Very gravelly loam, very gravelly sandy clay loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	25-65	15-55	15-40	10-30	20-30	NP-10
98B:												
Niart-----------	0-6	Loam	CL-ML, ML	A-4	0	0	95-100	90-95	75-85	65-75	20-30	NP-10
	6-24	Loam, clay loam, gravelly loam	CL-ML	A-4	0	0-10	75-90	65-80	60-75	55-65	20-30	5-10
	24-60	Very gravelly loam, very gravelly sandy clay loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	25-65	15-55	15-40	10-30	20-30	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
98B: (cont.)												
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-15	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	15-22	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	22-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
98C:												
Niart-----------	0-6	Loam	CL-ML, ML	A-4	0	0	95-100	90-95	75-85	65-75	20-30	NP-10
	6-24	Loam, clay loam, gravelly loam	CL-ML	A-4	0	0-10	75-90	65-80	60-75	55-65	20-30	5-10
	24-60	Very gravelly loam, very gravelly sandy clay loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	25-65	15-55	15-40	10-30	20-30	NP-10
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-15	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	15-22	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	22-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
98D:												
Niart-----------	0-6	Loam	CL-ML, ML	A-4	0	0	95-100	90-95	75-85	65-75	20-30	NP-10
	6-24	Loam, clay loam, gravelly loam	CL-ML	A-4	0	0-10	75-90	65-80	60-75	55-65	20-30	5-10
	24-60	Very gravelly loam, very gravelly sandy clay loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	10-15	25-65	15-55	15-40	10-30	20-30	NP-10
Rothiemay-------	0-7	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	50-75	25-30	5-10
	7-15	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	90-100	80-100	75-95	55-80	25-35	5-15
	15-60	Clay loam, gravelly clay loam, loam	CL-ML, CL, GM-GC, GC	A-6, A-4	0	0-5	65-95	60-95	55-95	40-80	25-35	5-15
123C:												
Creed-----------	0-5	Loam	CL-ML, SC-SM	A-4	0	0	90-100	75-100	65-95	45-75	20-30	5-10
	5-10	Silty clay, clay, silty clay loam	CL, CH	A-6, A-7	0	0	90-100	75-100	70-100	60-95	35-60	15-35
	10-35	Silty clay loam, clay loam, clay	CL, SC	A-6, A-7	0	0	90-100	75-100	60-100	35-90	30-50	15-25
	35-60	Stratified loam to silty clay loam	CL	A-6, A-7	0	0	90-100	75-100	65-100	50-90	30-45	10-20
Gerdrum---------	0-3	Loam	CL-ML	A-4	0	0	80-100	75-100	60-90	50-80	25-30	5-10
	3-10	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	10-23	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	90-100	90-100	85-100	75-95	40-60	20-40
	23-60	Clay loam, sandy clay loam, clay	CL, SC, CH	A-6, A-7	0	0	90-100	90-100	80-95	45-75	35-55	15-35
130B:												
Busby-----------	0-3	Fine sandy loam	SM	A-4		0	100	100	60-85	35-50	20-25	NP-5
	3-14	Fine sandy loam sandy loam, loam	SM, ML	A-4		0	100	100	60-90	35-75	20-25	NP-5
	14-60	Fine sandy loam sandy loam	SM	A-4	0	0	100	100	60-85	34-50	20-25	NP-5
Twilight--------	0-3	Sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	3-11	Fine sandy loam sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	11-29	Fine sandy loam sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	29	Weathered bedrock	---	---		---	---	---	---	---	---	---

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
131C:												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
132B:												
Twilight--------	0-3	Sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	3-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	11-35	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Blacksheep------	0-4	Sandy loam	SM, ML	A-4	0	0	100	100	65-85	40-60	15-20	NP-5
	4-18	Fine sandy loam, sandy loam, very fine sandy loam	SM, ML	A-4	0	0	100	90-100	65-85	35-60	15-20	NP-5
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
138B:												
Zatoville-------	0-2	Silty clay loam	CL	A-6	0	0	100	100	90-100	85-100	30-40	10-20
	2-13	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25
	13-19	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25
	19-60	Silty clay loam, silty clay	CL	A-6, A-7	0	0	100	100	90-100	85-100	35-45	15-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
138B: (cont.)												
Orinoco---------	0-3	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	3-16	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	16-24	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
140B:												
Kobase----------	0-6	Silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	85-100	80-95	30-45	10-20
	6-24	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
	24-60	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-50	15-25
Megonot---------	0-10	Silty clay loam	CL	A-6, A-7	0	0	95-100	85-100	85-100	75-100	35-45	15-25
	10-18	Silty clay loam, clay loam, silty clay	CL	A-6, A-7	0	0	85-100	75-100	75-90	65-90	35-45	15-25
	18-35	Silty clay loam, clay loam, shaly silty clay	CL, GC	A-6, A-7	0	0	65-100	55-100	45-90	40-90	35-45	15-25
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
140C:												
Kobase----------	0-6	Silty clay loam	CL	A-7, A-6	0	0	95-100	90-100	85-100	80-95	30-45	10-20
	6-24	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-45	15-25
	24-60	Silty clay loam, silty clay, clay	CL	A-7, A-6	0	0	95-100	90-100	85-100	75-95	35-45	15-25
Megonot---------	0-10	Silty clay loam	CL	A-6, A-7	0	0	95-100	85-100	85-100	75-100	35-45	15-25
	10-18	Silty clay loam, clay loam, silty clay	CL	A-6, A-7	0	0	85-100	75-100	75-90	65-90	35-45	15-25
	18-35	Silty clay loam, clay loam, shaly silty clay	CL, GC	A-6, A-7	0	0	65-100	55-100	45-90	40-90	35-45	15-25
	35-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
142A:												
Rothiemay-------	0-7	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	50-75	25-30	5-10
	7-15	Loam, clay loam	CL, CL-ML	A-6	0	0-5	90-100	80-100	75-95	55-80	25-35	5-15
	15-60	Clay loam, loam, gravelly clay loam	CL, CL-ML, GM-GC, GC	A-6, A-4	0	0-5	65-95	60-95	55-90	40-80	25-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
142B:												
Rothiemay-------	0-7	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	50-75	25-30	5-10
	7-15	Loam, clay loam	CL, CL-ML	A-6	0	0-5	90-100	80-100	75-95	55-80	25-35	5-15
	15-60	Clay loam, loam, gravelly clay loam	CL, CL-ML, GM-GC, GC	A-6, A-4	0	0-5	65-95	60-95	55-90	40-80	25-35	5-15
142C:												
Rothiemay-------	0-6	Loam	CL-ML	A-4	0	0-5	90-100	80-100	75-95	50-75	25-30	5-10
	6-15	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-5	90-100	80-100	75-95	55-80	25-35	5-15
	15-60	Clay loam, gravelly clay loam, loam	CL-ML, CL, GM-GC, GC	A-6, A-4	0	0-5	65-95	60-95	55-95	40-80	25-35	5-15
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-15	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	15-26	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	26-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
152A:												
Eapa------------	0-5	Loam	CL, ML	A-4, A-6, A-7	0	0-5	95-100	85-100	80-95	55-85	30-45	7-20
	5-15	Clay loam, loam	CL, ML	A-6, A-7	0	0-5	95-100	85-100	75-95	55-85	35-50	10-25
	15-32	Loam, sandy clay loam, clay loam	CL	A-4, A-6, A-7	0	0-5	95-100	85-100	75-95	55-85	30-45	8-20
	32-60	Loam, clay loam	CL	A-4, A-6, A-7	0	0-5	95-100	80-100	75-95	50-80	30-45	8-20
Attewan---------	0-5	Loam	ML, CL-ML	A-4	0	0-5	85-100	80-100	70-90	55-75	20-30	NP-10
	5-14	Clay loam, sandy clay loam, gravelly loam	CL, SC	A-6	0	0-5	75-100	70-100	55-85	35-70	30-40	10-20
	14-26	Clay loam, gravelly loam, sandy clay loam	CL, SC, GC	A-6	0	0-5	70-100	65-100	50-85	35-65	30-40	10-20
	26-60	Very gravelly loamy sand, extremely gravelly loamy sand, very gravelly sand	GP, GP-GM, GM, SM	A-1	0	0-15	25-55	15-50	5-20	0-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
153C:												
Tanna-----------	0-4	Loam	CL-ML	A-4	0	0-5	90-100	90-100	85-95	70-80	25-30	5-10
	4-12	Clay loam, clay, silty clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-95	75-90	35-45	15-25
	12-25	Very channery loam, channery clay loam, clay loam	GM-GC, CL-ML, CL	A-2, A-4, A-6	0	0-10	40-100	30-95	25-80	20-70	25-40	5-15
	25-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
153D:												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Tanna-----------	0-4	Loam	CL-ML	A-4	0	0-5	90-100	90-100	85-95	70-80	25-30	5-10
	4-12	Clay loam, clay, silty clay loam	CL	A-6, A-7	0	0-5	90-100	90-100	80-95	75-90	35-45	15-25
	12-25	Very channery loam, channery clay loam, clay loam	GM-GC, CL-ML, CL	A-2, A-4, A-6	0	0-10	40-100	30-95	25-80	20-70	25-40	5-15
	25-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
154C:												
Marmarth--------	0-4	Fine sandy loam	SM, SC-SM	A-2-4, A-4	0	0	100	100	85-95	60-80	20-25	NP-5
	4-8	Clay loam, loam, sandy clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	60-80	25-40	5-20
	8-31	Loam, fine sandy loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	60-80	25-35	5-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
154D:												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Marmarth--------	0-4	Fine sandy loam	SM, SC-SM	A-2, A-4	0	0	100	100	60-75	30-45	20-25	NP-5
	4-8	Clay loam, loam, sandy clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	60-80	25-40	5-20
	8-31	Loam, fine sandy loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	90-100	60-80	25-35	5-15
	31-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
158A:												
Ethridge--------	0-6	Clay loam	CL	A-6	0	0	100	95-100	85-100	70-80	25-40	10-20
	6-14	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	95-100	95-100	90-95	40-50	20-30
	14-25	Clay loam, silty clay loam, clay	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	35-50	15-30
	25-60	Silty clay loam, clay loam, silt loam	CL	A-6, A-7	0	0	100	95-100	90-100	85-95	30-50	10-25
Verson----------	0-4	Clay loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	60-90	50-75	25-40	5-15
	4-9	Silty clay loam, clay loam, clay	CL, CH	A-6, A-7	0	0-5	90-100	85-100	70-95	65-90	35-55	15-30
	9-22	Silty clay loam, clay, gravelly clay loam	CL	A-6, A-7	0	0-10	80-100	70-100	60-95	55-85	35-50	15-25
	22-60	Very gravelly sandy loam, very gravelly loam, extremely gravelly loam	GM, GP-GM	A-1	0	10-15	20-50	15-40	10-30	5-25	20-25	NP-5
167D:												
Yawdim----------	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-16	Silty clay loam, clay loam, clay	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
167D: (cont.)												
Orinoco----------	0-3	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	3-16	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	16-24	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
167E:												
Yawdim-----------	0-2	Silty clay loam	CL	A-6, A-7	0	0	100	100	90-100	80-90	30-45	10-20
	2-11	Silty clay loam, clay loam, clay loam	CL, CH	A-7	0	0	100	100	90-100	70-95	40-60	15-35
	11-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Orinoco----------	0-3	Silty clay loam	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	3-16	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	16-24	Silty clay loam, silty clay, clay	CL	A-6, A-7	0	0	100	100	90-100	85-95	35-45	15-25
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
181D:												
Cabbart----------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Crago------------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
181D: (cont.)												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
181E:												
Cabbart---------	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Crago-----------	0-4	Gravelly loam	GM-GC, GM, CL-ML, SC-SM	A-4	0	0-10	60-75	55-70	50-65	35-55	20-30	NP-10
	4-10	Gravelly loam, gravelly clay loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0-5	0-15	40-65	35-60	30-55	20-45	25-35	5-15
	10-21	Extremely gravelly loam, very gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-1, A-2	0-5	0-15	25-45	15-35	10-25	5-20	20-30	NP-10
	21-60	Extremely gravelly loamy sand, extremely gravelly sandy loam, very gravelly sandy loam	GP, GP-GM, GM, GM-GC	A-1	0-5	0-15	30-50	15-35	5-20	0-15	15-25	NP-5
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-10	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	10-22	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-85	20-40	5-20
	22-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
189C:												
Rentsac----------	0-2	Fine sandy loam	SM	A-2, A-4	0	0-10	90-100	85-100	60-85	30-50	20-25	NP-5
	2-12	Very cobbly loam, extremely flaggy loam, very channery sandy loam	GM	A-1, A-2	0-5	15-40	35-60	30-55	25-45	15-35	20-25	NP-5
	12-22	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart----------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
189E:												
Rentsac----------	0-2	Fine sandy loam	SM	A-2, A-4	0	0-10	90-100	85-100	60-85	30-50	20-25	NP-5
	2-12	Very cobbly loam, extremely flaggy loam, very channery sandy loam	GM	A-1, A-2	0-5	15-40	35-60	30-55	25-45	15-35	20-25	NP-5
	12-22	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
230C:												
Macar------------	0-5	Loam	CL-ML	A-4	0	0	100	100	75-95	55-70	25-30	5-10
	5-16	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	16-29	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	29-60	Stratified sandy clay loam to silt loam	CL-ML, CL	A-6, A-4	0	0	90-100	85-100	70-90	50-75	25-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
232E:												
Hughesville-----	0-10	Very flaggy clay loam	GC, GM-GC, CL, CL-ML	A-4, A-6	0-5	40-45	55-75	50-70	40-65	35-60	25-35	5-15
	10-22	Very flaggy loam, very flaggy clay loam, very flaggy silty clay loam	SC, SC-SM, GC, GM-GC	A-4, A-6	0-5	40-50	60-85	50-75	45-60	40-50	20-35	5-15
	22-38	Extremely flaggy loam, extremely flaggy clay loam, extremely flaggy silty clay loam	GC, GM-GC	A-2	5-10	45-55	25-55	15-45	10-40	10-35	20-35	5-15
	38-48	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Tibs------------	0-6	Cobbly clay loam	CL	A-6, A-7	0-5	20-35	80-95	75-90	60-80	50-70	30-45	10-20
	6-30	Very cobbly clay, very cobbly clay loam	CL, CH, GC, SC	A-7, A-6	5-10	35-45	55-80	50-75	45-70	40-65	35-60	15-40
	30-60	Very cobbly clay, very cobbly clay loam	CL, CH, GC, SC	A-7, A-6	5-10	40-50	60-85	55-80	45-75	40-65	35-60	15-40
Whitecow--------	0-6	Flaggy loam	ML, CL-ML	A-4	0	15-30	80-100	70-90	60-85	50-75	20-30	NP-10
	6-20	Very gravelly loam, very cobbly clay loam, extremely channery loam	GM-GC, GC	A-4, A-6, A-2	0-5	15-30	35-70	25-60	20-55	15-50	20-35	5-15
	20-60	Extremely gravelly loam, extremely cobbly clay loam, extremely channery loam	GM-GC, GC	A-2	0-5	25-50	25-45	15-35	10-30	10-30	20-35	5-15
234F:												
Tibs------------	0-6	Cobbly clay loam	CL	A-6, A-7	0-5	20-35	80-95	75-90	60-80	50-70	30-45	10-20
	6-30	Very cobbly clay, very cobbly clay loam	CL, CH, GC, SC	A-7, A-6	5-10	35-45	55-80	50-75	45-70	40-65	35-60	15-40
	30-60	Very cobbly clay, very cobbly clay loam	CL, CH, GC, SC	A-7, A-6	5-10	40-50	60-85	55-80	45-75	40-65	35-60	15-40

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
234F:(cont.)												
Whitecow--------	0-6	Cobbly clay loam	CL-ML, CL	A-4, A-6	0	15-30	75-100	70-90	65-85	55-80	25-35	5-15
	6-20	Very gravelly loam, very cobbly clay loam, extremely channery loam	GM-GC, GC	A-4, A-6, A-2	0-5	15-30	35-70	25-60	20-55	15-50	20-35	5-15
	20-60	Extremely gravelly loam, extremely cobbly clay loam, extremely channery loam	GM-GC, GC	A-2	0-5	25-50	25-45	15-35	10-30	10-30	20-35	5-15
240E:												
Ridge-----------	0-4	Sandy loam	SC-SM, SM	A-4	0	0	100	100	65-85	35-50	15-25	NP-10
	4-16	Sandy loam, loam	CL-ML, SC-SM, ML, SM	A-4	0	0	100	100	65-85	45-65	15-25	NP-10
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Dast------------	0-5	Fine sandy loam	SM, ML	A-4, A-2	0	0	80-100	75-100	65-90	30-55	15-25	NP-5
	5-33	Fine sandy loam, sandy loam, loam	SM, ML	A-4, A-2	0	0	80-100	75-100	55-85	30-55	15-25	NP-5
	33-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
241E:												
Twilight--------	0-3	Fine sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	3-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	11-28	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Blacksheep------	0-4	Fine sandy loam	SM, ML	A-4	0	0	100	100	65-85	40-60	15-20	NP-5
	4-18	Fine sandy loam, sandy loam, very fine sandy loam	SM, ML	A-4	0	0	100	90-100	65-85	35-60	15-20	NP-5
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
242D:												
Dast------------	0-6	Sandy loam	SM, ML	A-4, A-2	0	0	80-100	75-100	50-80	30-55	15-25	NP-5
	6-37	Fine sandy loam, sandy loam, loam	SM, ML	A-4, A-2	0	0	80-100	75-100	55-85	30-55	15-25	NP-5
	37-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
242D: (cont.)												
Ridge	0-5	Sandy loam	SC-SM, SM	A-4	0	0	100	100	65-85	35-50	15-25	NP-10
	5-18	Sandy loam, loam	CL-ML, SC-SM, ML, SM	A-4	0	0	100	100	65-85	45-65	15-25	NP-10
	18-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
242F:												
Ridge	0-4	Sandy loam	SC-SM, SM	A-4	0	0	100	100	65-85	35-50	15-25	NP-10
	4-16	Sandy loam, loam	CL-ML, SC-SM, ML, SM	A-4	0	0	100	100	65-85	45-65	15-25	NP-10
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Dast	0-5	Sandy loam	SM, ML	A-4, A-2	0	0	80-100	75-100	50-80	30-55	15-25	NP-5
	5-33	Fine sandy loam, sandy loam, loam	SM, ML	A-4, A-2	0	0	80-100	75-100	55-85	30-55	15-25	NP-5
	33-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
243F:												
Blacksheep	0-4	Sandy loam	SM, ML	A-4	0	0	100	100	65-85	40-60	15-20	NP-5
	4-18	Fine sandy loam, sandy loam, very fine sandy loam	SM, ML	A-4	0	0	100	90-100	65-85	35-60	15-20	NP-5
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Twilight	0-3	Sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	3-11	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	11-28	Fine sandy loam, sandy loam	SM	A-4	0	0	100	100	60-90	35-50	20-30	NP-5
	28-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
245C:												
Lamedeer	0-5	Channery loam	SC-SM, SM, GM-GC, GM	A-4	0	0	60-80	50-75	45-65	35-50	20-30	NP-10
	5-34	Channery loam, very channery loam	SC-SM, SM, GM, GM-GC	A-4, A-2	0	0	45-80	35-75	30-60	25-50	20-30	NP-10
	34-60	Very channery loam, very channery sandy loam, extremely channery sandy loam	GM	A-1	0	25-30	35-50	25-45	20-35	10-25	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
245C: (cont.)												
Ringling--------	0-5	Channery loam	GM, SM	A-4	0	0-10	60-80	55-75	50-60	35-50	20-30	NP-5
	5-14	Very channery loam, extremely channery loam	GM	A-1, A-2	0	10-40	25-60	15-50	15-40	10-35	20-30	NP-5
	14-20	Very channery loam, extremely channery loam	GM	A-1, A-2	0	10-40	25-60	15-50	15-40	10-35	20-30	NP-5
	20-60	Fragmental material	GP	A-1	0	80-85	15-25	5-10	0-5	0-5	---	NP
245F:												
Lamedeer--------	0-5	Channery loam	SC-SM, SM, GM-GC, GM	A-4	0	0	60-80	50-75	45-65	35-50	20-30	NP-10
	5-34	Channery loam, very channery loam	SC-SM, SM, GM, GM-GC	A-4, A-2	0	0	45-80	35-75	30-60	25-50	20-30	NP-10
	34-60	Very channery loam, very channery sandy loam, extremely channery sandy loam	GM	A-1	0	25-30	35-50	25-45	20-35	10-25	15-25	NP-5
Ringling--------	0-5	Channery loam	GM, SM	A-4	0	0-10	60-80	55-75	50-60	35-50	20-30	NP-5
	5-14	Very channery loam, extremely channery loam	GM	A-1, A-2	0	10-40	25-60	15-50	15-40	10-35	20-30	NP-5
	14-20	Very channery loam, extremely channery loam	GM	A-1, A-2	0	10-40	25-60	15-50	15-40	10-35	20-30	NP-5
	20-60	Fragmental material	GP	A-1	0	80-85	15-25	5-10	0-5	0-5	---	NP
246F:												
Lamedeer--------	0-5	Channery loam	SC-SM, SM, GM-GC, GM	A-4	0	0	60-80	50-75	45-65	35-50	20-30	NP-10
	5-34	Channery loam, very channery loam	SC-SM, SM, GM, GM-GC	A-4, A-2	0	0	45-80	35-75	30-60	25-50	20-30	NP-10
	34-60	Very channery loam, very channery sandy loam, extremely channery sandy loam	GM	A-1	0	25-30	35-50	25-45	20-35	10-25	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
246F:(cont.)												
Ringling--------	0-5	Channery loam	GM, SM	A-4	0	0-10	60-80	55-75	50-60	35-50	20-30	NP-5
	5-14	Very channery loam, extremely channery loam	GM	A-1, A-2	0	10-40	25-60	15-50	15-40	10-35	20-30	NP-5
	14-20	Very channery loam, extremely channery loam	GM	A-1, A-2	0	10-40	25-60	15-50	15-40	10-35	20-30	NP-5
	20-60	Fragmental material	GP	A-1	0	80-85	15-25	5-10	0-5	0-5	---	NP
250E:												
Macmeal---------	0-11	Channery loam	ML, SM	A-4	0	5-15	75-85	65-75	55-70	40-55	25-35	NP-5
	11-36	Very channery clay loam, very gravelly clay loam	GC	A-6, A-2	0	10-30	35-65	25-55	25-55	20-45	30-40	10-15
	36-60	Very channery clay loam, very flaggy clay loam	GC	A-6, A-2	0-5	15-40	35-70	25-60	25-55	20-50	30-40	10-15
Rock outcrop.												
251C:												
Savage----------	0-5	Loam	CL-ML	A-4	0	0	95-100	95-100	90-100	75-95	25-30	5-10
	5-17	Silty clay, silty clay loam	CL	A-7, A-6	0	0	95-100	95-100	85-100	75-95	35-50	15-30
	17-60	Silty clay, silty clay loam	CL	A-7, A-6	0	0-5	90-100	85-100	75-100	65-95	30-50	10-30
252D:												
Hilger----------	0-4	Stony loam	GM-GC, SC-SM, CL-ML	A-4	0	15-30	60-80	55-75	45-70	35-60	25-30	5-10
	4-18	Very cobbly clay loam, extremely cobbly clay loam, very stony loam	GC, CL	A-6, A-2	0	40-65	40-85	30-80	25-75	20-65	30-40	10-15
	18-30	Very stony clay loam, extremely cobbly loam, extremely stony loam	GM-GC, GC	A-2	0	50-65	40-55	30-45	25-40	20-35	25-35	5-15
	30-60	Extremely stony loam, extremely cobbly loam	GM-GC	A-2	0	50-65	40-55	30-45	25-40	20-35	25-30	5-10
Rock outcrop.												

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
252E:												
Hilger----------	0-4	Stony loam	GM-GC, SC-SM, CL-ML	A-4	10-15	5-15	60-80	55-75	45-70	35-60	25-30	5-10
	4-18	Very cobbly clay loam, extremely cobbly clay loam, very stony loam	GC, CL	A-6, A-2	0	40-65	40-85	30-80	25-75	20-65	30-40	10-15
	18-30	Very stony clay loam, extremely cobbly loam, extremely stony loam	GM-GC, GC	A-2	0	50-65	40-55	30-45	25-40	20-35	25-35	5-15
	30-60	Extremely stony loam, extremely cobbly loam	GM-GC	A-2	0	50-65	40-55	30-45	25-40	20-35	25-30	5-10
254C:												
Fergus----------	0-6	Clay loam	CL, CL-ML	A-4, A-6	0	0	80-100	75-100	65-90	60-85	25-40	5-15
	6-15	Clay loam, silty clay loam, clay	CL, CH	A-6, A-7	0	0	80-100	75-100	65-95	60-90	35-55	15-30
	15-60	Silty clay loam, clay loam, clay	CL	A-6, A-7	0	0	80-100	75-100	60-95	55-90	30-50	10-25
255C:												
Shambo----------	0-7	Loam	CL-ML	A-4	0	0	100	100	85-100	65-90	25-30	5-10
	7-16	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	85-100	65-90	25-35	5-15
	16-60	Loam, clay loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	65-95	25-35	5-15
Korchea---------	0-6	Loam	CL-ML, CL	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-60	Stratified fine sandy loam to silty clay loam	CL-ML, CL	A-4	0	0	100	100	85-95	60-75	25-30	5-10
Barvon----------	0-10	Loam	CL-ML, CL	A-4, A-6	0	0	95-100	95-100	85-95	65-80	25-35	5-15
	10-29	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	60-80	25-35	5-15
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
255D:												
Barvon----------	0-10	Loam	CL-ML, CL	A-4, A-6	0	0	95-100	95-100	85-95	65-80	25-35	5-15
	10-29	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	60-80	25-35	5-15
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
255D: (cont.)												
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-17	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Shambo----------	0-7	Loam	CL-ML	A-4	0	0	100	100	85-100	65-90	25-30	5-10
	7-16	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	85-100	65-90	25-35	5-15
	16-60	Loam, clay loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	65-95	25-35	5-15
256C:												
Yamacall--------	0-3	Loam	CL-ML	A-4	0	0-5	85-100	80-100	60-85	55-75	25-30	5-10
	3-11	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	65-90	60-80	25-35	5-15
	11-60	Loam, clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	85-100	80-100	60-85	55-75	25-35	5-15
Havre-----------	0-4	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	4-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
260F:												
Kuro------------	0-3	Silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-80	30-40	10-20
	3-15	Clay loam, clay	CL	A-6, A-7	0	0	100	90-100	80-95	70-85	35-50	15-25
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Wayden----------	0-4	Silty clay loam	CL	A-6	0	0	100	100	90-100	70-95	30-40	10-20
	4-17	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	15-30
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
261F:												
Wayden----------	0-4	Silty clay loam	CL	A-6	0	0	100	100	90-100	70-95	30-40	10-20
	4-17	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	15-30
	17-60	Unweathered	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
261F: (cont.)												
Castner	0-7	Channery loam	ML, CL-ML, SM, GM	A-4	0	0-15	65-80	60-75	50-70	35-60	20-30	NP-10
	7-13	Extremely channery loam, very cobbly loam, very channery sandy loam	GM, GM-GC, GP-GM	A-2, A-1, A-4	0-5	10-35	30-65	20-55	15-45	10-40	20-30	NP-10
	13-18	Extremely channery loam, very channery sandy loam, very flaggy loam	GM, GM-GC, GP-GM	A-2, A-1	5-10	20-30	25-60	15-50	10-40	5-35	20-30	NP-10
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
262E:												
Wayden	0-4	Silty clay loam	CL	A-6	0	0	100	100	90-100	70-95	30-40	10-20
	4-17	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	15-30
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Windham	0-6	Gravelly clay loam	CL-ML, CL, GC, GM-GC	A-4, A-6	0	0-10	60-80	55-75	45-65	40-60	25-35	5-15
	6-11	Gravelly clay loam, very gravelly loam, clay loam	GM-GC, SC-SM, CL-ML, GC	A-4, A-6, A-2	0	0-25	40-90	35-85	30-65	25-60	20-35	5-15
	11-22	Extremely gravelly loam, extremely gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC	A-2, A-1	0	10-30	25-50	15-30	10-25	10-20	20-30	NP-10
	22-60	Extremely gravelly loam, extremely gravelly sandy loam, extremely gravelly clay loam	GM, GM-GC, GP-GM	A-1, A-2	0	10-30	25-50	15-30	10-25	5-20	15-30	NP-10
280D:												
Cabbart	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
280D: (cont.)												
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
280E:												
Castner---------	0-7	Channery loam	ML, CL-ML, SM, GM	A-4	0	0-15	65-80	60-75	50-70	35-60	20-30	NP-10
	7-13	Extremely channery loam, very cobbly loam, very channery sandy loam	GM, GM-GC, GP-GM	A-2, A-1, A-4	0-5	10-35	30-65	20-55	15-45	10-40	20-30	NP-10
	13-18	Extremely channery loam, very channery sandy loam, very flaggy loam	GM, GM-GC, GP-GM	A-2, A-1	5-10	20-30	25-60	15-50	10-40	5-35	20-30	NP-10
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Kuro------------	0-3	Silty clay loam	CL	A-6	0	0	100	95-100	85-100	70-80	30-40	10-20
	3-15	Clay loam, clay	CL	A-6, A-7	0	0	100	90-100	80-95	70-85	35-50	15-25
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
281D:												
Doney-----------	0-4	Loam	ML, CL-ML	A-4	0	0	85-100	75-100	65-95	50-75	20-30	NP-10
	4-26	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	65-95	55-85	25-35	5-15
	26-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-17	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Macar-----------	0-5	Loam	CL-ML	A-4	0	0	100	100	75-95	55-70	25-30	5-10
	5-11	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	11-28	Clay loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	75-95	60-85	25-40	5-15
	28-60	Stratified sandy clay loam to silt loam	CL-ML, CL	A-6, A-4	0	0	90-100	85-100	70-90	50-75	25-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
281E:												
Castner---------	0-5	Channery loam	ML, CL-ML, SM, GM	A-4	0	0-15	65-80	60-75	50-70	35-60	20-30	NP-10
	5-10	Extremely channery loam, very cobbly loam, very channery sandy loam	GM, GM-GC, GP-GM	A-2, A-1, A-4	0-5	10-35	30-65	20-55	15-45	10-40	20-30	NP-10
	10-15	Extremely channery loam, very channery sandy loam, very flaggy loam	GM, GM-GC, GP-GM	A-2, A-1	5-10	20-30	25-60	15-50	10-40	5-35	20-30	NP-10
	15-25	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
282D:												
Castner---------	0-7	Channery loam	ML, CL-ML, SM, GM	A-4	0	0-15	65-80	60-75	50-70	35-60	20-30	NP-10
	7-13	Extremely channery loam, very cobbly loam, very channery sandy loam	GM, GM-GC, GP-GM	A-2, A-1, A-4	0-5	10-35	30-65	20-55	15-45	10-40	20-30	NP-10
	13-18	Extremely channery loam, very channery sandy loam, very flaggy loam	GM, GM-GC, GP-GM	A-2, A-1	5-10	20-30	25-60	15-50	10-40	5-35	20-30	NP-10
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
283D:												
Barvon----------	0-10	Loam	CL-ML, CL	A-4, A-6	0	0	95-100	95-100	85-95	65-80	25-35	5-15
	10-29	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	60-80	25-35	5-15
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-17	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
283F:												
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-12	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
284D:												
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-17	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Barvon----------	0-10	Loam	CL-ML, CL	A-4, A-6	0	0	95-100	95-100	85-95	65-80	25-35	5-15
	10-29	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	60-80	25-35	5-15
	29-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
284F:												
Doney-----------	0-4	Loam	ML, CL-ML	A-4	0	0	85-100	75-100	65-95	50-75	20-30	NP-10
	4-24	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	65-95	55-85	25-35	5-15
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Wayden----------	0-4	Silty clay loam	CL	A-6	0	0	100	100	90-100	70-95	30-40	10-20
	4-17	Silty clay, clay, silty clay loam	CL, CH	A-7	0	0	100	100	90-100	75-95	40-60	15-30
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
285D:												
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-17	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Doney-----------	0-4	Loam	ML, CL-ML	A-4	0	0	85-100	75-100	65-95	50-75	20-30	NP-10
	4-26	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	65-95	55-85	25-35	5-15
	26-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
285F:												
Cabba-----------	0-3	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	3-17	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	17-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Doney-----------	0-4	Loam	ML, CL-ML	A-4	0	0	85-100	75-100	65-95	50-75	20-30	NP-10
	4-24	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	85-100	75-100	65-95	55-85	25-35	5-15
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
286F:												
Cabbart	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Rock outcrop.												
287D:												
Delpoint	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabbart	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
287F:												
Cabbart	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Delpoint	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-11	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	11-22	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	22-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
288D:												
Delpoint	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-15	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	15-30	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	30-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
288D: (cont.)												
Cabbart---------	0-3	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	3-12	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	12-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Havre-----------	0-4	Loam	CL-ML	A-4	0	0	100	100	80-95	60-90	20-30	5-10
	4-60	Stratified fine sandy loam to clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	80-95	60-80	20-35	5-15
288F:												
Cabbart---------	0-4	Loam	CL-ML	A-4	0	0	90-100	85-100	65-85	55-75	25-30	5-10
	4-16	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-100	60-90	55-85	25-35	5-15
	16-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	NP
Delpoint--------	0-3	Loam	CL-ML	A-4	0	0	95-100	90-100	75-90	55-75	20-30	5-10
	3-11	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	11-22	Loam, clay loam, silty clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	65-90	20-40	5-20
	22-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
289D:												
Barvon----------	0-10	Loam	CL-ML, CL	A-4, A-6	0	0	95-100	95-100	85-95	65-80	25-35	5-15
	10-24	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	60-80	25-35	5-15
	24-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-12	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Korchea---------	0-6	Loam	CL-ML, CL	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-60	Stratified fine sandy loam to silty clay loam	CL-ML, CL	A-4	0	0	100	100	85-95	60-75	25-30	5-10
289F:												
Cabba-----------	0-2	Loam	ML, CL-ML	A-4	0	0-5	90-100	85-100	70-90	60-80	20-30	NP-10
	2-12	Clay loam, silty clay loam, loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	90-100	85-100	80-95	25-35	5-15
	12-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Barvon----------	0-10	Loam	CL-ML, CL	A-4, A-6	0	0	95-100	95-100	85-95	65-80	25-35	5-15
	10-29	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	80-95	60-80	25-35	5-15
	29-60	Unweathered	---	---	---	---	---	---	---	---	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
291C:												
Windham---------	0-6	Very stony loam	GM, GM-GC	A-4, A-2	10-20	15-20	45-70	40-65	35-60	25-50	20-30	NP-10
	6-11	Gravelly loam, very gravelly loam, gravelly clay loam	GM, GM-GC, SM, SC-SM	A-2, A-4, A-1	0	10-30	30-90	25-80	20-60	15-50	20-30	NP-10
	11-22	Extremely gravelly loam, extremely gravelly clay loam, extremely gravelly sandy loam	GM, GM-GC	A-1, A-2	0	10-30	25-50	15-30	10-25	10-20	20-30	NP-10
	22-60	Extremely gravelly loam, extremely gravelly sandy loam, extremely gravelly clay loam	GM, GM-GC, GP-GM	A-1, A-2	0	10-30	25-50	15-30	10-25	5-20	15-30	NP-10
292A:												
Straw-----------	0-21	Loam	ML, CL-ML	A-4	0	0	90-100	85-100	60-90	55-85	20-30	NP-10
	21-45	Loam, silty clay loam, clay loam	CL-ML, CL	A-6, A-4	0	0	90-100	85-100	65-95	55-90	25-35	5-15
	45-60	Stratified loam to loamy sand	SM, ML	A-2, A-4	0	0	90-100	85-100	50-80	25-55	15-25	NP-5
Korchea---------	0-6	Loam	CL-ML, CL	A-4	0	0	100	100	85-95	60-75	25-30	5-10
	6-60	Stratified fine sandy loam to silty clay loam	CL-ML, CL	A-4	0	0	100	100	85-95	60-75	25-30	5-10
294C:												
Shambo----------	0-7	Loam	CL-ML	A-4	0	0	100	100	85-100	65-90	25-30	5-10
	7-16	Loam, silt loam, clay loam	CL-ML, CL	A-4, A-6	0	0	100	100	85-100	65-90	25-35	5-15
	16-60	Loam, clay loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0	100	100	90-100	65-95	25-35	5-15
295F:												
Bitton----------	0-15	Gravelly loam	ML, CL-ML, GM, SM	A-4	0	0-10	70-85	60-75	50-65	40-60	20-30	NP-10
	15-35	Gravelly loam, channery loam, very gravelly loam	GM, GM-GC, SM, SC-SM	A-2, A-1, A-4	0	0-15	40-80	30-70	25-60	20-50	20-30	NP-10
	35-60	Stratified gravelly loam to extremely gravelly sandy loam	GM, GM-GC	A-1, A-2	0	0-25	45-60	40-55	30-45	20-35	15-30	NP-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
295F:(cont.)												
Winifred--------	0-3	Clay loam	CL	A-6, A-7	0	0	95-100	95-100	80-95	60-85	30-45	10-20
	3-12	Clay loam, silty clay, clay	CL, CH	A-7	0	0	95-100	95-100	80-100	65-95	40-55	15-30
	12-35	Clay, silty clay, silty clay loam	CL, CH	A-7	0	0	95-100	95-100	85-100	70-100	40-55	15-30
	35-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Castner---------	0-7	Channery loam	ML, CL-ML, SM, GM	A-4	0	0-15	65-80	60-75	50-70	35-60	20-30	NP-10
	7-13	Extremely channery loam, very cobbly loam, very channery sandy loam	GM, GM-GC, GP-GM	A-2, A-1, A-4	0-5	10-35	30-65	20-55	15-45	10-40	20-30	NP-10
	13-18	Extremely channery loam, very channery sandy loam, very flaggy loam	GM, GM-GC, GP-GM	A-2, A-1	5-10	20-30	25-60	15-50	10-40	5-35	20-30	NP-10
	18-28	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
296D:												
Borky-----------	0-3	Very stony loam	ML, GM, GM-GC, CL-ML	A-4, A-2	0	30-45	55-90	45-80	35-70	30-60	20-30	NP-10
	3-11	Very stony clay, very stony clay loam	CL, CH, GC	A-6, A-7	0	30-55	55-85	50-80	40-75	35-65	35-55	15-30
	11-33	Very stony silty clay, very stony clay loam	CL, GC	A-6, A-7	0	30-55	55-85	50-80	45-75	40-70	35-50	15-25
	33-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP
Sinnigam--------	0-5	Very stony clay loam	CL, GC	A-6	0	15-40	55-100	50-90	45-85	40-75	25-35	10-15
	5-17	Extremely stony clay loam, very stony clay, very channery clay loam	GC	A-6, A-7, A-2	0	25-50	35-70	30-65	25-60	20-50	35-50	15-25
	17-27	Unweathered bedrock	---	---	---	---	---	---	---	---	---	NP

Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1E:												
Badland.												
2E:												
Rock outcrop.												
3A:												
Riverwash.												
5A:												
Harlake---------	0-5	40-55	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4	86
	5-60	35-60	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
6A:												
Harlake---------	0-5	40-55	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4	86
	5-60	35-55	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
7A:												
Lostriver-------	0-3	40-55	1.40-1.55	0.06-0.20	0.12-0.18	High	0.5-2.0	0.37	---	5	4	86
	3-7	35-55	1.40-1.55	0.06-0.20	0.12-0.18	High	0.5-1.0	0.32	---			
	7-60	35-55	1.40-1.55	0.06-0.20	0.11-0.17	High	0.5-1.0	0.32	---			
7B:												
Lostriver-------	0-3	40-55	1.40-1.55	0.06-0.20	0.12-0.18	High	0.5-2.0	0.37	---	5	4	86
	3-7	35-55	1.40-1.55	0.06-0.20	0.12-0.18	High	0.5-1.0	0.32	---			
	7-60	35-55	1.40-1.55	0.06-0.20	0.11-0.17	High	0.5-1.0	0.32	---			
Bullhook--------	0-5	15-27	1.30-1.50	0.60-2.00	0.13-0.18	Low	0.5-2.0	0.37	0.37	5	5	56
	5-11	18-35	1.30-1.55	0.60-2.00	0.12-0.20	Moderate	0.5-2.0	0.32	0.32			
	11-60	18-35	1.30-1.55	0.60-2.00	0.11-0.17	Moderate	0.5-2.0	0.32	0.32			
8A:												
Harlake---------	0-5	40-55	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4	86
	5-60	35-55	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
Havre-----------	0-6	10-22	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-30	1.30-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
8B:												
Harlake---------	0-5	40-55	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4	86
	5-60	35-60	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
9A:												
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
9B:												
Havre-----------	0-6	10-22	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-30	1.30-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
10A:												
Havre-----------	0-6	10-22	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-30	1.30-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
11A:												
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Glendive--------	0-8	5-15	1.30-1.50	2.00-6.00	0.13-0.16	Low	0.5-2.0	0.20	0.20	5	3	86
	8-14	5-18	1.30-1.50	2.00-6.00	0.15-0.18	Low	0.5-1.0	0.32	0.32			
	14-60	5-18	1.35-1.60	2.00-6.00	0.10-0.14	Low	0.5-1.0	0.20	0.20			
11B:												
Havre-----------	0-6	10-22	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-30	1.30-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Glendive--------	0-8	5-15	1.40-1.60	2.00-6.00	0.10-0.13	Low	0.5-2.0	0.20	0.20	5	3	86
	8-14	5-18	1.35-1.60	2.00-6.00	0.15-0.19	Low	0.5-1.0	0.32	0.32			
	14-60	5-18	1.35-1.60	2.00-6.00	0.10-0.13	Low	0.5-1.0	0.20	0.20			
12A:												
Havre-----------	0-6	10-22	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	6-60	18-30	1.30-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Harlake---------	0-5	35-50	1.25-1.35	0.06-0.20	0.11-0.13	High	1.0-2.0	0.32	0.32	5	4	86
	5-15	35-50	1.30-1.40	0.06-0.20	0.11-0.13	High	0.5-1.0	0.32	0.32			
	15-60	35-50	1.30-1.40	0.06-0.20	0.11-0.13	High	0.5-1.0	0.32	0.32			
13A:												
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	4L	86
	6-60	18-35	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
14A:												
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	4L	86
	6-60	18-35	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Glendive--------	0-8	5-15	1.30-1.50	2.00-6.00	0.13-0.16	Low	0.5-2.0	0.20	0.20	5	3	86
	8-14	5-18	1.30-1.50	2.00-6.00	0.15-0.18	Low	0.5-1.0	0.32	0.32			
	14-60	5-18	1.35-1.60	2.00-6.00	0.10-0.14	Low	0.5-1.0	0.20	0.20			
14B:												
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	4L	86
	6-60	18-35	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Glendive--------	0-8	5-15	1.40-1.60	2.00-6.00	0.10-0.13	Low	0.5-2.0	0.20	0.20	5	3	86
	8-14	5-18	1.35-1.60	2.00-6.00	0.15-0.19	Low	0.5-1.0	0.32	0.32			
	14-60	5-18	1.35-1.60	2.00-6.00	0.10-0.13	Low	0.5-1.0	0.20	0.20			
15A:												
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	4L	86
	6-60	18-35	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Harlake---------	0-5	40-50	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4	86
	5-60	35-60	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
16A:												
Havre-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	4L	86
	4-60	18-35	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
16A:(cont.)												
Yamacall--------	0-5	18-27	1.20-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.37	0.37	5	4L	86
	5-28	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
	28-60	10-27	1.25-1.45	2.00-6.00	0.14-0.18	Low	0.0-0.5	0.32	0.32			
17A:												
Harlake---------	0-5	40-50	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4	86
	5-60	35-60	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
Havre-----------	0-6	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	4L	86
	6-60	18-35	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
20B:												
Harlake---------	0-5	40-55	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-1.0	0.32	0.32	5	4	86
	5-60	35-55	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
Marvan----------	0-2	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4	86
	2-17	45-60	1.30-1.50	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	17-60	45-60	1.30-1.50	0.01-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37			
Vanda-----------	0-2	40-60	1.25-1.45	0.01-0.06	0.08-0.12	High	0.5-2.0	0.37	0.37	5	4	86
	2-12	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
	12-60	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
21A:												
McKenzie--------	0-4	40-60	1.00-1.40	0.01-0.06	0.13-0.17	High	2.0-4.0	0.28	0.28	5	4	86
	4-25	40-60	1.20-1.60	0.01-0.06	0.13-0.17	High	0.5-2.0	0.37	0.37			
	25-60	40-60	1.20-1.60	0.01-0.06	0.13-0.17	High	0.0-0.5	0.37	0.37			
22B:												
Nobe------------	0-1	27-40	1.30-1.50	0.06-0.20	0.13-0.16	Moderate	0.5-2.0	0.43	0.43	5	6	48
	1-60	35-60	1.30-1.50	0.01-0.06	0.06-0.07	High	0.5-1.0	0.43	0.43			
Absher----------	0-1	40-55	1.20-1.40	0.01-0.06	0.10-0.13	High	1.0-2.0	0.37	0.37	2	4	86
	1-6	35-60	1.35-1.60	0.01-0.06	0.08-0.10	High	0.5-1.0	0.37	0.37			
	6-60	35-50	1.30-1.55	0.01-0.06	0.05-0.07	High	0.0-0.5	0.43	0.43			
23A:												
Gerdrum---------	0-3	20-27	1.15-1.35	0.60-2.00	0.18-0.22	Low	1.0-3.0	0.49	0.49	2	6	48
	3-10	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	10-23	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	23-60	30-50	1.30-1.55	0.01-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43			
Vanda-----------	0-2	40-60	1.25-1.45	0.01-0.06	0.08-0.12	High	0.5-2.0	0.37	0.37	5	4	86
	2-12	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
23B:												
Gerdrum---------	0-3	20-27	1.15-1.35	0.60-2.00	0.18-0.22	Low	1.0-3.0	0.49	0.49	2	6	48
	3-10	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	10-23	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	23-60	30-50	1.30-1.55	0.01-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43			
Vanda-----------	0-2	40-60	1.25-1.45	0.01-0.06	0.08-0.12	High	0.5-2.0	0.37	0.37	5	4	86
	2-60	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
Creed-----------	0-5	20-27	1.15-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.43	0.43	2	6	48
	5-10	35-55	1.30-1.55	0.06-0.20	0.10-0.14	High	1.0-2.0	0.32	0.32			
	10-35	27-45	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37			
	35-60	25-35	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
23C:												
Gerdrum----------	0-3	20-27	1.15-1.35	0.60-2.00	0.18-0.22	Low	1.0-3.0	0.49	0.49	2	6	48
	3-10	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	10-23	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	23-60	30-50	1.30-1.55	0.01-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43			
Creed-----------	0-5	20-27	1.15-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.43	0.43	2	6	48
	5-10	35-55	1.30-1.55	0.06-0.20	0.10-0.14	High	1.0-2.0	0.32	0.32			
	10-35	27-45	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37			
	35-60	25-35	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37			
25A:												
Vanda-----------	0-2	40-60	1.25-1.45	0.01-0.06	0.08-0.12	High	0.5-2.0	0.37	0.37	5	4	86
	2-12	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
	12-60	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
26A:												
Weingart--------	0-2	18-27	1.20-1.40	0.06-0.20	0.16-0.19	Low	1.0-2.0	0.43	0.43	2	6	48
	2-14	35-60	1.30-1.55	0.01-0.06	0.12-0.15	High	0.5-1.0	0.37	0.37			
	14-21	35-55	1.30-1.55	0.01-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37			
	21-32	35-55	1.30-1.55	0.01-0.06	0.08-0.10	High	0.0-0.5	0.37	0.37			
	32-60	---	---	---	---		---	---	---			
26B:												
Weingart--------	0-2	18-27	1.20-1.40	0.06-0.20	0.16-0.19	Low	1.0-2.0	0.43	0.43	2	6	48
	2-14	35-60	1.30-1.55	0.01-0.06	0.12-0.15	High	0.5-1.0	0.37	0.37			
	14-21	35-55	1.30-1.55	0.01-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37			
	21-32	35-55	1.30-1.55	0.01-0.06	0.08-0.10	High	0.0-0.5	0.37	0.37			
	32-60	---	---	---	---		---	---	---			
Warhorse--------	0-3	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	6	48
	3-12	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	0.5-1.0	0.32	0.32			
	12-16	30-40	1.30-1.50	0.06-0.20	0.08-0.12	High	0.0-0.5	0.32	0.32			
	16-60	---	---	---	---		---	---	---			
30C:												
Busby-----------	0-6	10-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.20	0.20	4	3	86
	6-13	10-18	1.40-1.60	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.32	0.32			
	13-43	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	43-60	3-18	1.50-1.70	6.00-20.00	0.08-0.10	Low	0.0-0.5	0.20	0.20			
30D:												
Busby-----------	0-6	10-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.20	0.20	4	3	86
	6-13	10-18	1.40-1.60	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.32	0.32			
	13-43	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	43-60	3-18	1.50-1.70	6.00-20.00	0.08-0.10	Low	0.0-0.5	0.20	0.20			
31B:												
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
31C:												
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
31C:(cont.)												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
32B:												
Twilight--------	0-3	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	3-11	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	11-35	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	35-60	---	1.30-1.50	---	---		---	---	---			
32D:												
Twilight--------	0-3	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	3-11	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	11-35	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	35-60	---	1.30-1.50	---	---		---	---	---			
Blacksheep------	0-4	5-15	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	2	3	86
	4-18	5-15	1.30-1.55	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	18-60	---	---	---	---		---	---	---			
Rock outcrop.												
33A:												
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
33B:												
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
34A:												
Yamacall--------	0-7	27-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.32	0.32	5	6	48
	7-14	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	14-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
34B:												
Yamacall--------	0-7	27-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.32	0.32	5	6	48
	7-14	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	14-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
35B:												
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
Busby-----------	0-6	10-18	1.30-1.50	2.00-6.00	0.12-0.16	Low	1.0-2.0	0.20	0.20	4	3	86
	6-13	10-18	1.40-1.60	2.00-6.00	0.12-0.16	Low	0.5-1.0	0.32	0.32			
	13-43	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	43-60	3-18	1.50-1.70	6.00-20.00	0.08-0.10	Low	0.0-0.5	0.20	0.20			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
36B:												
Yamacall---------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
Delpoint---------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
37A:												
Yamacall---------	0-7	27-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32	5	4L	86
	7-14	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
	14-60	10-27	1.25-1.45	2.00-6.00	0.14-0.18	Low	0.0-0.5	0.32	0.32			
37B:												
Yamacall---------	0-7	27-35	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-3.0	0.32	0.32	5	4L	86
	7-14	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
	14-60	10-27	1.25-1.45	2.00-6.00	0.14-0.18	Low	0.0-0.5	0.32	0.32			
38A:												
Kobase-----------	0-6	27-40	1.20-1.40	0.20-0.60	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	7	38
	6-24	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	24-60	35-45	1.30-1.55	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
Zatoville--------	0-2	30-40	1.20-1.40	0.20-0.60	0.16-0.19	Moderate	1.0-3.0	0.37	0.37	4	4	86
	2-13	33-45	1.30-1.50	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	13-19	35-45	1.30-1.50	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			
	19-60	35-45	1.30-1.50	0.06-0.20	0.10-0.13	Moderate	0.0-0.5	0.37	0.37			
38B:												
Zatoville--------	0-2	30-40	1.20-1.40	0.20-0.60	0.16-0.19	Moderate	1.0-3.0	0.37	0.37	4	4	86
	2-13	33-45	1.30-1.50	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	13-19	35-45	1.30-1.50	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			
	19-60	35-45	1.30-1.50	0.06-0.20	0.10-0.13	Moderate	0.0-0.5	0.37	0.37			
39B:												
Delpoint---------	0-3	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L	86
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
39C:												
Delpoint---------	0-3	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L	86
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Cabbart----------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Yamacall---------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
40B:												
Kobase-----------	0-6	27-40	1.20-1.40	0.20-0.60	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	7	38
	6-24	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	24-60	35-45	1.30-1.55	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
40C:												
Kobase----------	0-6	27-40	1.20-1.40	0.20-0.60	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	4L	86
	6-24	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	24-60	35-45	1.30-1.55	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
41A:												
Yamacall--------	0-5	18-27	1.20-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.37	0.37	5	4L	86
	5-28	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
	28-60	10-27	1.25-1.45	2.00-6.00	0.14-0.18	Low	0.0-0.5	0.32	0.32			
41B:												
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.37	0.37	5	4L	86
	3-25	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
	25-60	10-27	1.25-1.45	2.00-6.00	0.14-0.18	Low	0.0-0.5	0.32	0.32			
41C:												
Yamacall--------	0-5	18-27	1.20-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.37	0.37	5	4L	86
	5-28	18-35	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
	28-60	10-27	1.25-1.45	2.00-6.00	0.14-0.18	Low	0.0-0.5	0.32	0.32			
Delpoint--------	0-3	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L	86
	3-10	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37			
	10-22	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	22-60	---	---	---	---		---	---	---			
50B:												
Hinterland------	0-3	20-27	1.15-1.35	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.37	0.37	1	6	48
	3-12	27-45	1.35-1.55	0.20-0.60	0.12-0.15	High	1.0-2.0	0.20	0.32			
	12-22	---	---	---	---		---	---	---			
50C:												
Hinterland------	0-3	20-27	1.15-1.35	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.37	0.37	1	6	48
	3-12	27-45	1.35-1.55	0.20-0.60	0.12-0.15	High	1.0-2.0	0.20	0.32			
	12-22	---	---	---	---		---	---	---			
50D:												
Hinterland------	0-3	20-27	1.15-1.35	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.37	0.37	1	6	48
	3-12	27-45	1.35-1.55	0.20-0.60	0.12-0.15	High	1.0-2.0	0.20	0.32			
	12-22	---	---	---	---		---	---	---			
Delplain--------	0-3	27-40	1.20-1.40	0.60-2.00	0.12-0.14	Moderate	0.5-2.0	0.17	0.37	1	6	48
	3-12	35-45	1.30-1.55	0.20-0.60	0.06-0.07	Moderate	0.0-0.5	0.10	0.32			
	12-22	---	---	---	---		---	---	---			
51A:												
Ethridge--------	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	6	48
	6-14	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32			
	14-25	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	25-60	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
51B:												
Ethridge--------	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	6	48
	6-14	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32			
	14-25	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	25-60	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
52A:												
Eapa------------	0-5	20-27	1.20-1.30	0.60-2.00	0.17-0.19	Moderate	2.0-4.0	0.28	0.28	5	6	48
	5-15	24-34	1.30-1.45	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.28	0.32			
	15-32	20-33	1.30-1.45	0.60-2.00	0.16-0.20	Moderate	0.0-1.0	0.28	0.32			
	32-60	18-30	1.35-1.50	0.60-2.00	0.17-0.20	Moderate	0.0-0.5	0.28	0.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
52B:												
Eapa------------	0-5	20-27	1.20-1.30	0.60-2.00	0.17-0.19	Moderate	2.0-4.0	0.28	0.28	5	6	48
	5-15	24-34	1.30-1.45	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.28	0.32			
	15-32	20-33	1.30-1.45	0.60-2.00	0.16-0.20	Moderate	0.0-1.0	0.28	0.32			
	32-60	18-30	1.35-1.50	0.60-2.00	0.17-0.20	Moderate	0.0-0.5	0.28	0.32			
53A:												
Tanna-----------	0-4	20-27	1.10-1.30	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.43	0.43	3	6	48
	4-12	35-50	1.30-1.50	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	12-25	15-40	1.30-1.50	0.06-0.20	0.10-0.12	Moderate	0.5-1.0	0.20	0.37			
	25-60	---	---	---	---		---	---	---			
54A:												
Marmarth--------	0-4	10-18	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	4-8	18-35	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32			
	8-31	15-30	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.32	0.32			
	31-60	---	---	---	---		---	---	---			
56A:												
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
Musselshell-----	0-4	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	4-20	10-27	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.20	0.37			
	20-60	10-18	1.50-1.75	2.00-6.00	0.06-0.10	Low	0.0-0.5	0.05	0.37			
Attewan---------	0-5	10-20	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	5	56
	5-14	20-35	1.40-1.60	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32			
	14-26	15-30	1.40-1.60	0.60-2.00	0.13-0.15	Moderate	0.5-1.0	0.32	0.32			
	26-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24			
57A:												
Attewan---------	0-5	10-20	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	5	56
	5-14	20-35	1.40-1.60	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32			
	14-26	15-30	1.40-1.60	0.60-2.00	0.13-0.15	Moderate	0.5-1.0	0.32	0.32			
	26-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24			
57B:												
Attewan---------	0-2	10-20	1.20-1.40	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	3	5	56
	2-14	20-35	1.30-1.50	0.60-2.00	0.12-0.15	Moderate	1.0-2.0	0.32	0.32			
	14-26	15-30	1.35-1.55	0.60-2.00	0.12-0.14	Low	0.5-1.0	0.32	0.32			
	26-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24			
57C:												
Attewan---------	0-5	10-20	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	5	56
	5-14	20-35	1.40-1.60	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32			
	14-26	15-30	1.40-1.60	0.60-2.00	0.13-0.15	Moderate	0.5-1.0	0.32	0.32			
	26-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24			
Niart-----------	0-6	20-27	1.15-1.35	0.60-2.00	0.18-0.20	Low	2.0-4.0	0.37	0.37	2	4L	86
	6-24	20-30	1.30-1.50	0.60-2.00	0.16-0.19	Low	0.5-1.0	0.32	0.32			
	24-60	15-25	1.40-1.60	0.60-2.00	0.06-0.08	Low	0.0-0.5	0.10	0.43			
58A:												
Verson----------	0-4	27-40	1.15-1.35	0.20-0.60	0.17-0.20	Low	2.0-4.0	0.37	0.37	4	6	48
	4-9	35-55	1.15-1.40	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	9-22	35-50	1.30-1.50	0.06-0.20	0.13-0.16	Moderate	0.5-1.0	0.37	0.37			
	22-60	5-25	1.35-1.55	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.15	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
60B:												
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-32	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	32-60	---	---	---	---		---	---	---			
60C:												
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-32	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	32-60	---	---	---	---		---	---	---			
Neldore---------	0-3	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4	86
	3-6	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32			
	6-14	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.0-0.5	0.32	0.32			
	14-60	---	---	---	---		---	---	---			
60D:												
Neldore---------	0-3	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4	86
	3-6	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32			
	6-14	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.0-0.5	0.32	0.32			
	14-60	---	---	---	---		---	---	---			
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-32	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	32-60	---	---	---	---		---	---	---			
60E:												
Neldore---------	0-2	40-50	1.20-1.40	0.06-0.2	0.14-0.18	High	1.0-3.0	0.32	0.32	1	4	86
	2-9	40-60	1.30-1.50	0.06-0.2	0.12-0.16	High	0.5-1.0	0.32	0.32			
	9-17	40-60	1.30-1.50	0.06-0.2	0.12-0.16	High	0.0-0.5	0.32	0.32			
	17	---	---	---	---	---	---	---	---			
Abor------------	0-2	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	2-24	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	24	---	---	---	---	---	---	---	---			
61D:												
Neldore---------	0-3	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4	86
	3-5	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32			
	5-11	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Neldore, saline-	0-4	45-60	1.20-1.40	0.06-0.20	0.11-0.13	High	1.0-2.0	0.32	0.32	2	4	86
	4-18	45-60	1.30-1.50	0.06-0.20	0.10-0.12	High	0.5-1.0	0.32	0.32			
	18-60	---	---	---	---		---	---	---			
61E:												
Neldore---------	0-3	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4	86
	3-5	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32			
	5-11	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Volborg---------	0-3	40-50	1.30-1.50	0.06-0.20	0.14-0.17	High	1.0-2.0	0.32	0.32	2	2	134
	3-17	35-50	1.30-1.50	0.06-0.20	0.10-0.12	High	0.5-1.0	0.32	0.32			
	17-60	---	---	---	---		---	---	---			
62C:												
Neldore---------	0-3	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4	86
	3-6	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32			
	6-14	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.0-0.5	0.32	0.32			
	14-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
62D:												
Neldore---------	0-3	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4	86
	3-5	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32			
	5-11	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Yawdim----------	0-2	40-50	1.10-1.30	0.06-0.20	0.15-0.18	High	0.5-1.0	0.32	0.32	1	4	86
	2-11	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
62E:												
Neldore---------	0-3	40-50	1.20-1.40	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32	2	4	86
	3-5	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.5-1.0	0.32	0.32			
	5-11	40-60	1.30-1.50	0.06-0.20	0.12-0.16	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Rock outcrop.												
63A:												
Marias----------	0-4	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4	86
	4-28	40-60	1.30-1.50	0.01-0.06	0.12-0.16	High	0.5-1.0	0.37	0.37			
	28-60	40-60	1.30-1.55	0.01-0.06	0.12-0.16	High	0.0-0.5	0.37	0.37			
64A:												
Marvan----------	0-2	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4	86
	2-17	45-60	1.30-1.50	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	17-60	45-60	1.30-1.50	0.01-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37			
Vanda-----------	0-2	40-60	1.25-1.45	0.01-0.06	0.08-0.12	High	0.5-2.0	0.37	0.37	5	4	86
	2-12	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
	12-60	35-60	1.30-1.50	0.01-0.06	0.08-0.12	High	0.0-0.5	0.37	0.37			
64B:												
Marvan----------	0-2	40-60	1.25-1.45	0.06-0.20	0.14-0.18	High	0.5-2.0	0.37	0.37	5	4	86
	2-17	45-60	1.30-1.50	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	17-60	45-60	1.30-1.50	0.01-0.06	0.09-0.11	High	0.0-0.5	0.37	0.37			
67D:												
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-11	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
68C:												
Megonot---------	0-10	35-45	1.15-1.35	0.06-0.20	0.15-0.18	High	1.0-3.0	0.37	0.37	3	4	86
	10-18	35-45	1.25-1.45	0.06-0.20	0.12-0.14	High	0.5-1.0	0.37	0.37			
	18-35	35-45	1.30-1.50	0.06-0.20	0.10-0.12	High	0.0-0.5	0.37	0.37			
	35-60	---	---	---	---		---	---	---			
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-16	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	16-60	---	---	---	---		---	---	---			
69C:												
Orinoco---------	0-3	30-40	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.32	0.32	3	4L	86
	3-16	35-45	1.30-1.50	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			
	16-24	35-45	1.30-1.55	0.06-0.20	0.10-0.12	Moderate	0.0-0.5	0.37	0.37			
	24-60	---	---	---	---		---	---	---			
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-16	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	16-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
73D:												
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-16	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	16-60	---	---	---	---		---	---	---			
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-32	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	32-60	---	---	---	---		---	---	---			
73E:												
Yawdim----------	0-2	40-50	1.10-1.30	0.06-0.20	0.15-0.18	High	0.5-1.0	0.32	0.32	1	4	86
	2-11	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-27	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	27-60	---	---	---	---		---	---	---			
74D:												
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-32	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	32-60	---	---	---	---		---	---	---			
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	3	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
74E:												
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-27	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	27-60	---	---	---	---		---	---	---			
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
80E:												
Blacksheep------	0-4	5-15	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	2	3	86
	4-18	5-15	1.30-1.55	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	18-60	---	---	---	---		---	---	---			
Rock outcrop.												
Twilight--------	0-3	15-20	1.35-1.50	2.00-6.00	0.10-0.14	Low	1.0-2.0	0.20	0.20	3	3	86
	3-11	10-18	1.35-1.50	2.00-6.00	0.09-0.13	Low	0.0-2.0	0.24	0.24			
	11-35	7-18	1.40-1.60	2.00-6.00	0.08-0.13	Low	0.0-2.0	0.24	0.24			
	35-60	---	---	---	---		0.0-0.5	---	---			
81B:												
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
81C:												
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
81D:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
82B:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
82C:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Rock outcrop.												
82E:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-11	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	11-22	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	22-60	---	---	---	---		---	---	---			
Rock outcrop.												
83D:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Rock outcrop.												
Blacksheep------	0-4	5-15	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	2	3	86
	4-18	5-15	1.30-1.55	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	18-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
84C:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-16	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	16-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
84D:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-11	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Rock outcrop.												
84E:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-11	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-11	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	11-22	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	22-60	---	---	---	---		---	---	---			
85A:												
Cabbart---------	0-4	27-32	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.32	0.32	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
86D:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Rentsac---------	0-2	7-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-2.0	0.24	0.24	1	3	86
	2-12	7-18	1.45-1.70	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.20	---			
	12-60	---	---	---	---		---	---	---			
86E:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Rock outcrop.												

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
87B:												
Delpoint	0-3	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	4L	86
	3-11	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.37	0.37			
	11-22	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	22-60	---	---	---	---		---	---	---			
Cabbart	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
88D:												
Delpoint	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Cabbart	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Rock outcrop.												
89C:												
Rentsac	0-2	7-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-2.0	0.24	0.24	1	3	86
	2-12	7-18	1.45-1.70	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.20	---			
	12-22	---	---	---	---		---	---	---			
90B:												
Chinook	0-4	5-18	1.25-1.45	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	5	3	86
	4-34	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20			
	34-60	5-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-1.0	0.20	0.20			
91A:												
Kremlin	0-6	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6	48
	6-15	18-30	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	1.0-2.0	0.37	0.37			
	15-60	18-30	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
91B:												
Kremlin	0-6	18-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6	48
	6-15	18-30	1.25-1.45	0.60-2.00	0.16-0.20	Moderate	1.0-2.0	0.37	0.37			
	15-60	18-30	1.30-1.50	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.37	0.37			
92A:												
Binna	0-6	15-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	5	56
	6-25	18-27	1.30-1.55	0.60-2.00	0.12-0.15	Low	0.5-1.0	0.24	0.32			
	25-60	0-10	1.40-1.60	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.05	0.20			
93A:												
Crago	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
Musselshell	0-4	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	4-20	10-27	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.20	0.37			
	20-60	10-18	1.50-1.75	2.00-6.00	0.06-0.10	Low	0.0-0.5	0.05	0.37			
93B:												
Crago	0-4	15-27	1.30-1.50	0.60-2.00	0.13-0.16	Low	1.0-3.0	0.20	0.43	3	4L	86
	4-10	20-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	0.43			
	10-21	15-30	1.50-1.75	0.60-2.00	0.04-0.06	Low	0.0-0.5	0.10	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
94A:												
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	3	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
94E:												
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	3	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
95A:												
Crago-----------	0-4	15-27	1.30-1.50	0.60-2.00	0.13-0.16	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	0.37			
	10-21	15-30	1.50-1.75	0.60-2.00	0.04-0.06	Low	0.0-0.5	0.10	0.37			
	21-60	0-15	1.50-1.70	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.05	0.24			
Musselshell-----	0-4	20-27	1.15-1.35	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-20	10-27	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.20	0.37			
	20-60	10-18	1.50-1.75	2.00-6.00	0.06-0.10	Low	0.0-0.5	0.05	0.37			
95B:												
Crago-----------	0-4	15-27	1.30-1.50	0.60-2.00	0.13-0.16	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	0.37			
	10-21	15-30	1.50-1.75	0.60-2.00	0.04-0.06	Low	0.0-0.5	0.10	0.37			
	21-60	0-15	1.50-1.70	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.05	0.24			
Attewan---------	0-5	10-20	1.20-1.40	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.20	0.32	3	5	56
	5-14	20-35	1.30-1.50	0.60-2.00	0.12-0.15	Moderate	1.0-2.0	0.37	0.37			
	14-26	15-30	1.35-1.55	0.60-2.00	0.12-0.14	Low	0.5-1.0	0.37	0.37			
	26-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24			
Musselshell-----	0-4	20-27	1.15-1.35	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-20	10-27	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.20	0.37			
	20-60	10-18	1.50-1.75	2.00-6.00	0.06-0.10	Low	0.0-0.5	0.05	0.37			
95C:												
Crago-----------	0-4	15-27	1.30-1.50	0.60-2.00	0.13-0.16	Low	1.0-3.0	0.20	0.43	3	4L	86
	4-10	20-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	0.43			
	10-21	15-30	1.50-1.75	0.60-2.00	0.04-0.06	Low	0.0-0.5	0.10	---			
	21-60	0-15	1.50-1.70	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.05	---			
Attewan---------	0-5	10-20	1.20-1.40	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	3	5	56
	5-14	20-35	1.30-1.50	0.60-2.00	0.12-0.15	Moderate	1.0-2.0	0.32	0.32			
	14-26	15-30	1.35-1.55	0.60-2.00	0.12-0.14	Low	0.5-1.0	0.32	0.32			
	26-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24			
95E:												
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-11	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
96E:												
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
Abor------------	0-3	40-55	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-2.0	0.37	0.37	3	4	86
	3-27	35-60	1.30-1.55	0.01-0.06	0.14-0.16	High	0.5-1.0	0.37	0.37			
	27-60	---	---	---	---		---	---	---			
97A:												
Musselshell-----	0-4	20-27	1.15-1.35	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-20	10-27	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.20	0.37			
	20-60	10-18	1.50-1.75	2.00-6.00	0.06-0.10	Low	0.0-0.5	0.05	0.37			
Crago-----------	0-4	15-27	1.30-1.50	0.60-2.00	0.13-0.16	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-15	20-35	1.40-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	0.37			
	15-26	15-30	1.50-1.75	0.60-2.00	0.04-0.06	Low	0.0-0.5	0.10	0.37			
	26-60	0-15	1.50-1.70	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.05	0.24			
97B:												
Musselshell-----	0-4	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	4-20	10-27	1.40-1.60	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.20	0.37			
	20-60	10-18	1.50-1.75	2.00-6.00	0.06-0.10	Low	0.0-0.5	0.05	0.37			
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-15	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	15-26	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	26-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
98A:												
Niart-----------	0-6	20-27	1.15-1.30	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.24	0.43	2	4L	86
	6-24	20-30	1.30-1.50	0.60-2.00	0.16-0.19	Low	0.5-1.0	0.32	0.32			
	24-60	15-25	1.40-1.60	0.60-2.00	0.06-0.08	Low	0.0-0.5	0.10	0.43			
98B:												
Niart-----------	0-6	20-27	1.15-1.35	0.60-2.00	0.18-0.20	Low	2.0-4.0	0.37	0.37	2	4L	86
	6-24	20-30	1.30-1.50	0.60-2.00	0.16-0.19	Low	0.5-1.0	0.32	0.32			
	24-60	15-25	1.40-1.60	0.60-2.00	0.06-0.08	Low	0.0-0.5	0.10	0.43			
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-15	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	15-22	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	22-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
98C:												
Niart-----------	0-6	20-27	1.15-1.35	0.60-2.00	0.18-0.20	Low	2.0-4.0	0.37	0.37	2	4L	86
	6-24	20-30	1.30-1.50	0.60-2.00	0.16-0.19	Low	0.5-1.0	0.32	0.32			
	24-60	15-25	1.40-1.60	0.60-2.00	0.06-0.08	Low	0.0-0.5	0.10	0.43			
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-15	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	15-22	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	22-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
98D:												
Niart-----------	0-6	20-27	1.15-1.35	0.60-2.00	0.18-0.20	Low	2.0-4.0	0.37	0.37	2	4L	86
	6-24	20-30	1.30-1.50	0.60-2.00	0.16-0.19	Low	0.5-1.0	0.32	0.32			
	24-60	15-25	1.40-1.60	0.60-2.00	0.06-0.08	Low	0.0-0.5	0.10	0.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors K	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	g/cc	In/hr	In/in		Pct					
98D: (cont.)												
Rothiemay-------	0-7	15-27	1.15-1.35	0.60-2.00	0.15-0.19	Low	2.0-4.0	0.43	0.43	3	5	56
	7-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-60	18-35	1.30-1.50	0.20-0.60	0.13-0.17	Moderate	0.0-0.5	0.37	0.37			
123C:												
Creed-----------	0-5	20-27	1.15-1.40	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.43	0.43	2	6	48
	5-10	35-55	1.30-1.55	0.06-0.20	0.10-0.14	High	1.0-2.0	0.32	0.32			
	10-35	27-45	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37			
	35-60	25-35	1.30-1.55	0.06-0.20	0.08-0.12	Moderate	0.0-0.5	0.37	0.37			
Gerdrum---------	0-3	20-27	1.15-1.35	0.60-2.00	0.18-0.22	Low	1.0-3.0	0.49	0.49	2	6	48
	3-10	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	10-23	35-55	1.30-1.55	0.01-0.06	0.10-0.13	High	0.5-1.0	0.37	0.37			
	23-60	30-50	1.30-1.55	0.01-0.06	0.08-0.10	High	0.0-0.5	0.43	0.43			
130B:												
Busby-----------	0-3	10-18	1.30-1.50	2.0-6.0	0.12-0.16	Low	1.0-2.0	0.20	0.20	5	3	86
	3-14	10-18	1.40-1.60	2.0-6.0	0.12-0.16	Low	0.5-1.0	0.32	0.20			
	14-60	10-18	1.40-1.60	2.0-6.0	0.12-0.15	Low	0-0.5	0.20	0.20			
Twilight--------	0-3	5-18	1.15-1.40	2.0-6.0	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	3-11	5-18	1.25-1.50	2.0-6.0	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	11-29	5-18	1.25-1.50	2.0-6.0	0.12-0.15	Low	0-0.5	0.20	0.20			
	29	---	---	---	---	---	0-0.5	---	---			
131C:												
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
132B:												
Twilight--------	0-3	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	3-11	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	11-35	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	35-60	---	1.30-1.50	---	---		---	---	---			
Blacksheep------	0-4	5-15	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	2	3	86
	4-18	5-15	1.30-1.55	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	18-60	---	---	---	---		---	---	---			
138B:												
Zatoville-------	0-2	30-40	1.20-1.40	0.20-0.60	0.16-0.19	Moderate	1.0-3.0	0.37	0.37	4	4	86
	2-13	33-45	1.30-1.50	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	13-19	35-45	1.30-1.50	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			
	19-60	35-45	1.30-1.50	0.06-0.20	0.10-0.13	Moderate	0.0-0.5	0.37	0.37			
Orinoco---------	0-3	30-40	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.32	0.32	3	4L	86
	3-16	35-45	1.30-1.50	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			
	16-24	35-45	1.30-1.55	0.06-0.20	0.10-0.12	Moderate	0.0-0.5	0.37	0.37			
	24-60	---	---	---	---		---	---	---			
140B:												
Kobase----------	0-6	27-40	1.20-1.40	0.20-0.60	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	7	38
	6-24	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	24-60	35-45	1.30-1.55	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
140B: (cont.)												
Megonot----------	0-10	35-45	1.15-1.35	0.06-0.20	0.15-0.18	High	1.0-3.0	0.37	0.37	3	4	86
	10-18	35-45	1.25-1.45	0.06-0.20	0.12-0.14	High	0.5-1.0	0.37	0.37			
	18-35	35-45	1.30-1.50	0.06-0.20	0.10-0.12	High	0.0-0.5	0.37	0.37			
	35-60	---	---	---	---		---	---	---			
140C:												
Kobase-----------	0-6	27-40	1.20-1.40	0.20-0.60	0.16-0.20	Moderate	1.0-2.0	0.37	0.37	5	4L	86
	6-24	35-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	24-60	35-45	1.30-1.55	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
Megonot----------	0-10	35-45	1.15-1.35	0.06-0.20	0.15-0.18	High	1.0-3.0	0.37	0.37	3	4	86
	10-18	35-45	1.25-1.45	0.06-0.20	0.12-0.14	High	0.5-1.0	0.37	0.37			
	18-35	35-45	1.30-1.50	0.06-0.20	0.10-0.12	High	0.0-0.5	0.37	0.37			
	35-60	---	---	---	---		---	---	---			
142A:												
Rothiemay--------	0-7	15-27	1.15-1.35	0.60-2.00	0.15-0.19	Low	1.0-3.0	0.37	0.37	4	4L	86
	7-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-60	18-35	1.30-1.50	0.20-0.60	0.13-0.17	Moderate	0.0-0.5	0.37	0.37			
142B:												
Rothiemay--------	0-7	15-27	1.15-1.35	0.60-2.00	0.15-0.19	Low	1.0-3.0	0.37	0.37	4	4L	86
	7-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-60	18-35	1.30-1.50	0.20-0.60	0.13-0.17	Moderate	0.0-0.5	0.37	0.37			
142C:												
Rothiemay--------	0-6	15-27	1.15-1.35	0.60-2.00	0.15-0.19	Low	2.0-4.0	0.43	0.43	3	5	56
	6-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-60	18-35	1.30-1.50	0.20-0.60	0.13-0.17	Moderate	0.0-0.5	0.37	0.37			
Crago------------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-15	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	15-26	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	26-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
152A:												
Eapa-------------	0-5	20-27	1.20-1.30	0.60-2.00	0.17-0.19	Moderate	2.0-4.0	0.28	0.28	5	6	48
	5-15	24-34	1.30-1.45	0.60-2.00	0.16-0.20	Moderate	0.5-1.0	0.28	0.32			
	15-32	20-33	1.30-1.45	0.60-2.00	0.16-0.20	Moderate	0.0-1.0	0.28	0.32			
	32-60	18-30	1.35-1.50	0.60-2.00	0.17-0.20	Moderate	0.0-0.5	0.28	0.32			
Attewan----------	0-5	10-20	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	5	56
	5-14	20-35	1.40-1.60	0.60-2.00	0.14-0.17	Moderate	1.0-2.0	0.32	0.32			
	14-26	15-30	1.40-1.60	0.60-2.00	0.13-0.15	Moderate	0.5-1.0	0.32	0.32			
	26-60	0-10	1.40-1.60	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	0.24			
153C:												
Tanna------------	0-4	20-27	1.10-1.30	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.43	0.43	3	6	48
	4-12	35-50	1.30-1.50	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	12-25	15-40	1.30-1.50	0.06-0.20	0.10-0.12	Moderate	0.5-1.0	0.20	0.37			
	25-60	---	---	---	---		---	---	---			
Cabbart----------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
153D:												
Cabbart----------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
153D: (cont.)												
Tanna-----------	0-4	20-27	1.10-1.30	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.43	0.43	3	6	48
	4-12	35-50	1.30-1.50	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	12-25	15-40	1.30-1.50	0.06-0.20	0.10-0.12	Moderate	0.5-1.0	0.20	0.37			
	25-60	---	---	---	---		---	---	---			
154C:												
Marmarth--------	0-4	10-20	1.30-1.50	0.60-2.00	0.14-0.16	Low	1.0-3.0	0.24	0.24	3	3	86
	4-8	18-35	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32			
	8-31	15-30	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.32	0.32			
	31-60	---	---	---	---		---	---	---			
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
154D:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Marmarth--------	0-4	10-18	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	4-8	18-35	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32			
	8-31	15-30	1.35-1.60	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.32	0.32			
	31-60	---	---	---	---		---	---	---			
158A:												
Ethridge--------	0-6	27-35	1.15-1.35	0.20-0.60	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	5	6	48
	6-14	35-45	1.30-1.50	0.06-0.20	0.15-0.19	High	1.0-2.0	0.32	0.32			
	14-25	30-45	1.30-1.50	0.06-0.20	0.14-0.18	High	0.5-1.0	0.37	0.37			
	25-60	25-40	1.30-1.50	0.06-0.20	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
Verson----------	0-4	27-40	1.15-1.35	0.20-0.60	0.17-0.20	Low	2.0-4.0	0.37	0.37	4	6	48
	4-9	35-55	1.15-1.40	0.06-0.20	0.14-0.17	Moderate	1.0-2.0	0.37	0.37			
	9-22	35-50	1.30-1.50	0.06-0.20	0.13-0.16	Moderate	0.5-1.0	0.37	0.37			
	22-60	5-25	1.35-1.55	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.15	---			
167D:												
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-16	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	16-60	---	---	---	---		---	---	---			
Orinoco---------	0-3	30-40	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.32	0.32	3	4L	86
	3-16	35-45	1.30-1.50	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			
	16-24	35-45	1.30-1.55	0.06-0.20	0.10-0.12	Moderate	0.0-0.5	0.37	0.37			
	24-60	---	---	---	---		---	---	---			
167E:												
Yawdim----------	0-2	27-40	1.10-1.30	0.20-0.60	0.17-0.20	Moderate	0.5-1.0	0.37	0.37	1	4	86
	2-11	35-50	1.20-1.40	0.06-0.20	0.15-0.18	High	0.0-0.5	0.32	0.32			
	11-60	---	---	---	---		---	---	---			
Orinoco---------	0-3	30-40	1.15-1.35	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.32	0.32	3	4L	86
	3-16	35-45	1.30-1.50	0.06-0.20	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			
	16-24	35-45	1.30-1.55	0.06-0.20	0.10-0.12	Moderate	0.0-0.5	0.37	0.37			
	24-60	---	---	---	---		---	---	---			
181D:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
181D: (cont.)												
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
181E:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Crago-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.10-0.12	Low	1.0-3.0	0.20	0.37	2	4L	86
	4-10	20-35	1.30-1.50	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.15	0.43			
	10-21	18-30	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.0-5.0	0.10	---			
	21-60	0-20	1.45-1.70	6.00-20.00	0.02-0.03	Low	0.0-5.0	0.05	0.28			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-10	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.37	0.37			
	10-22	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	22-60	---	---	---	---		---	---	---			
189C:												
Rentsac---------	0-2	7-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-2.0	0.24	0.24	1	3	86
	2-12	7-18	1.45-1.70	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.20	---			
	12-22	---	---	---	---		---	---	---			
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
189E:												
Rentsac---------	0-2	7-18	1.35-1.55	2.00-6.00	0.11-0.13	Low	0.5-2.0	0.24	0.24	1	3	86
	2-12	7-18	1.45-1.70	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.20	---			
	12-22	---	---	---	---		---	---	---			
Rock outcrop.												
230C:												
Macar-----------	0-5	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6	48
	5-16	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.32	0.32			
	16-29	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32			
	29-60	15-30	1.30-1.60	0.60-2.00	0.13-0.16	Moderate	0.0-0.5	0.32	0.32			
232E:												
Hughesville-----	0-10	27-35	1.25-1.45	0.60-2.00	0.08-0.10	Low	2.0-4.0	0.10	0.32	2	6	48
	10-22	18-35	1.25-1.45	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.37			
	22-38	18-35	1.30-1.50	0.60-2.00	0.03-0.04	Low	0.0-0.5	0.05	0.37			
	38-48	---	---	---	---		---	---	---			
Tibs------------	0-6	30-40	1.30-1.50	0.20-0.60	0.10-0.13	Moderate	1.0-3.0	0.20	0.43	5	4	86
	6-30	35-55	1.45-1.65	0.06-0.20	0.07-0.08	High	0.5-1.0	0.17	---			
	30-60	35-55	1.40-1.60	0.06-0.20	0.07-0.08	High	0.0-0.5	0.17	---			
Whitecow--------	0-6	18-27	1.20-1.40	0.60-2.00	0.12-0.16	Low	0.5-2.0	0.20	0.37	3	5	56
	6-20	18-35	1.35-1.55	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.43			
	20-60	18-35	1.35-1.55	0.60-2.00	0.04-0.06	Low	0.0-0.5	0.05	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
234F:												
Tibs	0-6	30-40	1.30-1.50	0.20-0.60	0.10-0.13	Moderate	1.0-3.0	0.20	0.43	5	4	86
	6-30	35-55	1.45-1.65	0.06-0.20	0.07-0.08	High	0.5-1.0	0.17	---			
	30-60	35-55	1.40-1.60	0.06-0.20	0.07-0.08	High	0.0-0.5	0.17	---			
Whitecow	0-6	27-35	1.20-1.40	0.60-2.00	0.11-0.15	Low	0.5-2.0	0.17	0.32	3	6	48
	6-20	18-35	1.35-1.55	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	0.43			
	20-60	18-35	1.35-1.55	0.60-2.00	0.04-0.06	Low	0.0-0.5	0.05	---			
240E:												
Ridge	0-4	5-20	1.25-1.45	2.00-6.00	0.12-0.15	Low	2.0-4.0	0.20	0.20	2	3	86
	4-16	5-20	1.30-1.50	2.00-6.00	0.12-0.15	Low	1.0-2.0	0.28	0.28			
	16-60	---	---	---	---		---	---	---			
Dast	0-5	2-18	1.30-1.50	2.00-6.00	0.12-0.15	Low	1.0-2.0	0.20	0.20	3	3	86
	5-33	2-18	1.40-1.60	2.00-6.00	0.11-0.14	Low	0.5-1.0	0.20	0.20			
	33-60	---	---	---	---		---	---	---			
Rock outcrop.												
241E:												
Twilight	0-3	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	3-11	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	11-28	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	28-60	---	---	---	---		---	---	---			
Blacksheep	0-4	5-15	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	2	3	86
	4-18	5-15	1.30-1.55	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	18-60	---	---	---	---		---	---	---			
Rock outcrop.												
242D:												
Dast	0-6	2-18	1.30-1.50	2.00-6.00	0.12-0.15	Low	1.0-2.0	0.20	0.20	3	3	86
	6-37	2-18	1.40-1.60	2.00-6.00	0.11-0.14	Low	0.5-1.0	0.20	0.20			
	37-60	---	---	---	---		---	---	---			
Ridge	0-5	5-20	1.25-1.45	2.00-6.00	0.12-0.15	Low	2.0-4.0	0.20	0.20	2	3	86
	5-18	5-20	1.30-1.50	2.00-6.00	0.12-0.15	Low	1.0-2.0	0.28	0.28			
	18-60	---	---	---	---		---	---	---			
242F:												
Ridge	0-4	5-20	1.25-1.45	2.00-6.00	0.12-0.15	Low	2.0-4.0	0.20	0.20	2	3	86
	4-16	5-20	1.30-1.50	2.00-6.00	0.12-0.15	Low	1.0-2.0	0.28	0.28			
	16-60	---	---	---	---		---	---	---			
Dast	0-5	2-18	1.30-1.50	2.00-6.00	0.12-0.15	Low	1.0-2.0	0.20	0.20	3	3	86
	5-33	2-18	1.40-1.60	2.00-6.00	0.11-0.14	Low	0.5-1.0	0.20	0.20			
	33-60	---	---	---	---		---	---	---			
243F:												
Blacksheep	0-4	5-15	1.20-1.40	2.00-6.00	0.13-0.16	Low	1.0-2.0	0.20	0.20	2	3	86
	4-18	5-15	1.30-1.55	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	18-60	---	---	---	---		---	---	---			
Twilight	0-3	5-18	1.15-1.40	2.00-6.00	0.13-0.16	Low	1.0-3.0	0.20	0.20	3	3	86
	3-11	5-18	1.25-1.50	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	0.20			
	11-28	5-18	1.25-1.50	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.20	0.20			
	28-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
245C:												
Lamedeer--------	0-5	12-23	1.15-1.35	0.60-2.00	0.11-0.14	Low	2.0-4.0	0.20	0.37	3	5	56
	5-34	15-25	1.35-1.55	0.60-2.00	0.09-0.12	Low	1.0-2.0	0.17	0.37			
	34-60	8-20	1.40-1.65	0.60-2.00	0.05-0.06	Low	0.0-1.0	0.10	0.37			
Ringling--------	0-5	10-25	1.20-1.40	0.60-2.00	0.12-0.16	Low	2.0-5.0	0.17	0.32	1	5	56
	5-14	10-25	1.40-1.60	2.00-6.00	0.06-0.07	Low	1.0-2.0	0.10	---			
	14-20	10-25	1.40-1.60	2.00-6.00	0.06-0.07	Low	1.0-2.0	0.10	---			
	20-60	0-5	1.60-1.80	6.00-20.00	0.00-0.01	Low	0.0-0.5	0.02	---			
245F:												
Lamedeer--------	0-5	12-23	1.15-1.35	0.60-2.00	0.11-0.14	Low	2.0-4.0	0.20	0.37	3	5	56
	5-34	15-25	1.35-1.55	0.60-2.00	0.09-0.12	Low	1.0-2.0	0.17	0.37			
	34-60	8-20	1.40-1.65	0.60-2.00	0.05-0.06	Low	0.0-1.0	0.10	0.37			
Ringling--------	0-5	10-25	1.20-1.40	0.60-2.00	0.12-0.16	Low	2.0-5.0	0.17	0.32	1	5	56
	5-14	10-25	1.40-1.60	2.00-6.00	0.06-0.07	Low	1.0-2.0	0.10	---			
	14-20	10-25	1.40-1.60	2.00-6.00	0.06-0.07	Low	1.0-2.0	0.10	---			
	20-60	0-5	1.60-1.80	6.00-20.00	0.00-0.01	Low	0.0-0.5	0.02	---			
246F:												
Lamedeer--------	0-5	12-23	1.15-1.35	0.60-2.00	0.11-0.14	Low	2.0-4.0	0.20	0.37	3	5	56
	5-34	15-25	1.35-1.55	0.60-2.00	0.09-0.12	Low	1.0-2.0	0.17	0.37			
	34-60	8-20	1.40-1.65	0.60-2.00	0.05-0.06	Low	0.0-1.0	0.10	0.37			
Ringling--------	0-5	10-25	1.20-1.40	0.60-2.00	0.12-0.16	Low	2.0-5.0	0.17	0.32	1	5	56
	5-14	10-25	1.40-1.60	2.00-6.00	0.06-0.07	Low	1.0-2.0	0.10	---			
	14-20	10-25	1.40-1.60	2.00-6.00	0.06-0.07	Low	1.0-2.0	0.10	---			
	20-60	0-5	1.60-1.80	6.00-20.00	0.00-0.01	Low	0.0-0.5	0.02	---			
250E:												
Macmeal---------	0-11	10-25	1.15-1.35	0.60-2.00	0.10-0.13	Low	1.0-3.0	0.20	0.37	5	5	56
	11-36	27-35	1.30-1.50	0.20-0.60	0.06-0.07	Low	0.5-1.0	0.10	0.32			
	36-60	27-35	1.35-1.55	0.20-0.60	0.06-0.07	Low	0.0-0.5	0.10	0.32			
Rock outcrop.												
251C:												
Savage----------	0-5	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.43	0.43	5	6	48
	5-17	35-50	1.30-1.50	0.06-0.20	0.14-0.18	High	1.0-3.0	0.32	0.32			
	17-60	30-45	1.35-1.55	0.06-0.20	0.13-0.16	High	0.5-1.0	0.32	0.32			
252D:												
Hilger----------	0-4	15-27	1.10-1.30	0.60-2.00	0.11-0.13	Low	2.0-6.0	0.15	0.37	5	6	48
	4-18	25-35	1.20-1.40	0.60-2.00	0.06-0.07	Moderate	1.0-2.0	0.10	---			
	18-30	15-35	1.25-1.45	0.60-2.00	0.05-0.06	Low	0.5-1.0	0.05	---			
	30-60	15-27	1.30-1.50	0.60-2.00	0.05-0.06	Low	0.0-0.5	0.05	---			
Rock outcrop.												
252E:												
Hilger----------	0-4	15-27	1.10-1.30	0.60-2.00	0.11-0.13	Low	2.0-6.0	0.15	0.37	5	6	48
	4-18	25-35	1.20-1.40	0.60-2.00	0.06-0.07	Moderate	1.0-2.0	0.10	---			
	18-30	15-35	1.25-1.45	0.60-2.00	0.05-0.06	Low	0.5-1.0	0.05	---			
	30-60	15-27	1.30-1.50	0.60-2.00	0.05-0.06	Low	0.0-0.5	0.05	---			
254C:												
Fergus----------	0-6	27-35	1.15-1.35	0.60-2.00	0.14-0.18	Moderate	2.0-4.0	0.32	0.32	5	6	48
	6-15	35-50	1.20-1.40	0.20-0.60	0.14-0.18	High	1.0-3.0	0.37	0.37			
	15-60	27-45	1.30-1.50	0.20-0.60	0.12-0.15	Moderate	0.5-1.0	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
255C:												
Shambo----------	0-7	10-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-6.0	0.37	0.37	5	6	48
	7-16	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.37			
	16-60	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	0.5-1.0	0.37	0.37			
Korchea---------	0-6	18-27	1.20-1.50	0.60-2.00	0.17-0.21	Low	1.0-3.0	0.37	0.37	5	6	48
	6-60	18-35	1.30-1.60	0.60-2.00	0.15-0.18	Low	0.5-1.0	0.37	0.37			
Barvon----------	0-10	20-27	1.10-1.30	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	3	6	48
	10-29	20-30	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.0-1.0	0.37	0.37			
	29-60	---	---	---	---		---	---	---			
255D:												
Barvon----------	0-10	20-27	1.10-1.30	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	3	6	48
	10-29	20-30	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.0-1.0	0.37	0.37			
	29-60	---	---	---	---		---	---	---			
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-17	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	17-60	---	---	---	---		---	---	---			
Shambo----------	0-7	10-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-6.0	0.37	0.37	5	6	48
	7-16	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.37			
	16-60	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	0.5-1.0	0.37	0.37			
256C:												
Yamacall--------	0-3	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-2.0	0.37	0.37	5	6	48
	3-11	18-30	1.25-1.45	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-60	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
Havre-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	4-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
260F:												
Kuro------------	0-3	30-40	1.20-1.40	0.20-0.60	0.14-0.16	Moderate	0.5-2.0	0.37	0.37	1	4	86
	3-15	35-45	1.30-1.50	0.06-0.20	0.12-0.16	Moderate	0.5-1.0	0.37	0.37			
	15-60	---	---	---	---		---	---	---			
Wayden----------	0-4	30-40	1.15-1.35	0.20-0.60	0.17-0.20	Moderate	1.0-3.0	0.37	0.37	2	4	86
	4-17	35-50	1.20-1.40	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	0.32			
	17-60	---	---	---	---		---	---	---			
Rock outcrop.												
261F:												
Wayden----------	0-4	30-40	1.15-1.35	0.20-0.60	0.17-0.20	Moderate	1.0-3.0	0.37	0.37	2	4	86
	4-17	35-50	1.20-1.40	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	0.32			
	17-60	---	---	---	---		---	---	---			
Castner---------	0-7	10-18	1.10-1.30	0.60-6.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	1	5	56
	7-13	10-18	1.30-1.55	0.60-6.00	0.06-0.08	Low	1.0-2.0	0.10	0.32			
	13-18	10-18	1.35-1.55	0.60-6.00	0.06-0.07	Low	0.5-1.0	0.10	0.32			
	18-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
262E:												
Wayden----------	0-4	30-40	1.15-1.35	0.20-0.60	0.17-0.20	Moderate	1.0-3.0	0.37	0.37	2	4	86
	4-17	35-50	1.20-1.40	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	0.32			
	17-60	---	---	---	---		---	---	---			
Windham---------	0-6	27-35	1.20-1.40	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	2	4L	86
	6-11	18-35	1.30-1.50	0.60-2.00	0.09-0.12	Low	1.0-2.0	0.20	0.43			
	11-22	18-35	1.40-1.60	0.60-2.00	0.03-0.04	Low	0.5-1.0	0.05	0.32			
	22-60	18-35	1.40-1.60	0.60-2.00	0.03-0.04	Low	0.0-0.5	0.05	0.32			
280D:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
280E:												
Castner---------	0-7	10-18	1.10-1.30	0.60-6.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	1	5	56
	7-13	10-18	1.30-1.55	0.60-6.00	0.06-0.08	Low	1.0-2.0	0.10	0.32			
	13-18	10-18	1.35-1.55	0.60-6.00	0.06-0.07	Low	0.5-1.0	0.10	0.32			
	18-60	---	---	---	---		---	---	---			
Kuro------------	0-3	30-40	1.20-1.40	0.20-0.60	0.14-0.16	Moderate	0.5-2.0	0.37	0.37	1	4	86
	3-15	35-45	1.30-1.50	0.06-0.20	0.12-0.16	Moderate	0.5-1.0	0.37	0.37			
	15-60	---	---	---	---		---	---	---			
281D:												
Doney-----------	0-4	10-27	1.25-1.45	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	3	5	56
	4-26	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	26-60	---	---	---	---		---	---	---			
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-17	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	17-60	---	---	---	---		---	---	---			
Macar-----------	0-5	18-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	5	6	48
	5-11	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	1.0-2.0	0.32	0.32			
	11-28	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.32	0.32			
	28-60	15-30	1.30-1.60	0.60-2.00	0.13-0.16	Moderate	0.0-0.5	0.32	0.32			
281E:												
Castner---------	0-5	10-18	1.10-1.30	0.60-6.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	1	5	56
	5-10	10-18	1.30-1.55	0.60-6.00	0.06-0.08	Low	1.0-2.0	0.10	0.32			
	10-15	10-18	1.35-1.55	0.60-6.00	0.06-0.07	Low	0.5-1.0	0.10	0.32			
	15-25	---	---	---	---		---	---	---			
Rock outcrop.												
282D:												
Castner---------	0-7	10-18	1.10-1.30	0.60-6.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	1	5	56
	7-13	10-18	1.30-1.55	0.60-6.00	0.06-0.08	Low	1.0-2.0	0.10	0.32			
	13-18	10-18	1.35-1.55	0.60-6.00	0.06-0.07	Low	0.5-1.0	0.10	0.32			
	18-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
283D:												
Barvon----------	0-10	20-27	1.10-1.30	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	3	6	48
	10-29	20-30	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.0-1.0	0.37	0.37			
	29-60	---	---	---	---		---	---	---			
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-17	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	17-60	---	---	---	---		---	---	---			
283F:												
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-12	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Rock outcrop.												
284D:												
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-17	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	17-60	---	---	---	---		---	---	---			
Barvon----------	0-10	20-27	1.10-1.30	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	3	6	48
	10-29	20-30	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.0-1.0	0.37	0.37			
	29-60	---	---	---	---		---	---	---			
284F:												
Doney-----------	0-4	10-27	1.25-1.45	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	3	5	56
	4-24	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	24-60	---	---	---	---		---	---	---			
Wayden----------	0-4	30-40	1.15-1.35	0.20-0.60	0.17-0.20	Moderate	1.0-3.0	0.37	0.37	2	4	86
	4-17	35-50	1.20-1.40	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	0.32			
	17-60	---	---	---	---		---	---	---			
285D:												
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-17	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	17-60	---	---	---	---		---	---	---			
Doney-----------	0-4	10-27	1.25-1.45	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	3	5	56
	4-26	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	26-60	---	---	---	---		---	---	---			
285F:												
Cabba-----------	0-3	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	3-17	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	17-60	---	---	---	---		---	---	---			
Doney-----------	0-4	10-27	1.25-1.45	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	3	5	56
	4-24	18-30	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	24-60	---	---	---	---		---	---	---			
286F:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Rock outcrop.												

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
287D:												
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
287F:												
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-11	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-22	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	22-60	---	---	---	---		---	---	---			
288D:												
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-15	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	15-30	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	30-60	---	---	---	---		---	---	---			
Cabbart---------	0-3	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	3-12	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Havre-----------	0-4	15-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	0.5-2.0	0.37	0.37	5	5	56
	4-60	18-35	1.35-1.55	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.28	0.28			
288F:												
Cabbart---------	0-4	18-27	1.20-1.40	0.60-2.00	0.17-0.21	Low	1.0-2.0	0.37	0.37	2	4L	86
	4-16	18-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.37	0.37			
	16-60	---	---	---	---		---	---	---			
Delpoint--------	0-3	20-27	1.15-1.35	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	3	6	48
	3-11	18-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	11-22	18-35	1.30-1.55	0.60-2.00	0.14-0.18	Moderate	0.0-0.5	0.37	0.37			
	22-60	---	---	---	---		---	---	---			
289D:												
Barvon----------	0-10	20-27	1.10-1.30	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	3	6	48
	10-24	20-30	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.0-1.0	0.37	0.37			
	24-60	---	---	---	---		---	---	---			
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-12	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			
Korchea---------	0-6	18-27	1.20-1.50	0.60-2.00	0.17-0.21	Low	1.0-3.0	0.37	0.37	5	6	48
	6-60	18-35	1.30-1.60	0.60-2.00	0.15-0.18	Low	0.5-1.0	0.37	0.37			
289F:												
Cabba-----------	0-2	10-27	1.20-1.40	0.60-2.00	0.16-0.20	Low	1.0-3.0	0.37	0.37	2	4L	86
	2-12	20-35	1.30-1.50	0.60-2.00	0.14-0.18	Moderate	0.5-1.0	0.37	0.37			
	12-60	---	---	---	---		---	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea-bility	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodi-bility group	Wind erodi-bility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
289F: (cont.)												
Barvon----------	0-10	20-27	1.10-1.30	0.60-2.00	0.16-0.20	Moderate	1.0-3.0	0.37	0.37	3	6	48
	10-29	20-30	1.30-1.50	0.60-2.00	0.14-0.17	Moderate	0.0-1.0	0.37	0.37			
	29-60	---	---	---	---		---	---	---			
291C:												
Windham---------	0-6	18-27	1.15-1.35	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.15	0.32	3	4L	86
	6-11	18-35	1.20-1.45	0.60-2.00	0.08-0.10	Low	1.0-2.0	0.20	0.37			
	11-22	18-35	1.30-1.55	0.60-2.00	0.03-0.04	Low	0.5-1.0	0.05	0.32			
	22-60	18-35	1.35-1.55	0.60-2.00	0.03-0.04	Low	0.0-0.5	0.05	0.32			
292A:												
Straw-----------	0-21	10-27	1.05-1.25	0.60-2.00	0.18-0.22	Low	2.0-4.0	0.37	0.37	5	5	56
	21-45	18-32	1.25-1.50	0.60-2.00	0.14-0.18	Low	1.0-3.0	0.37	0.37			
	45-60	5-20	1.30-1.60	2.00-6.00	0.10-0.13	Low	0.0-0.5	0.24	0.24			
Korchea---------	0-6	18-27	1.20-1.50	0.60-2.00	0.17-0.21	Low	1.0-3.0	0.37	0.37	5	6	48
	6-60	18-35	1.30-1.60	0.60-2.00	0.15-0.18	Low	0.5-1.0	0.37	0.37			
294C:												
Shambo----------	0-7	10-27	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-6.0	0.37	0.37	5	6	48
	7-16	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	1.0-2.0	0.37	0.37			
	16-60	18-35	1.20-1.50	0.60-2.00	0.17-0.19	Moderate	0.5-1.0	0.37	0.37			
295F:												
Bitton----------	0-15	15-27	1.15-1.35	2.00-6.00	0.14-0.18	Low	2.0-4.0	0.24	0.43	5	5	56
	15-35	15-27	1.30-1.55	0.60-2.00	0.08-0.10	Low	1.0-2.0	0.17	0.43			
	35-60	10-25	1.40-1.65	0.60-6.00	0.07-0.08	Low	0.0-0.5	0.10	0.32			
Winifred--------	0-3	27-40	1.20-1.40	0.20-0.60	0.14-0.18	Moderate	1.0-3.0	0.37	0.37	3	6	48
	3-12	35-50	1.25-1.45	0.06-0.20	0.13-0.17	High	0.5-1.0	0.32	0.32			
	12-35	35-50	1.30-1.50	0.06-0.20	0.13-0.17	High	0.0-0.5	0.32	0.32			
	35-60	---	---	---	---		---	---	---			
Castner---------	0-7	10-18	1.10-1.30	0.60-6.00	0.12-0.14	Low	2.0-4.0	0.20	0.37	1	5	56
	7-13	10-18	1.30-1.55	0.60-6.00	0.06-0.08	Low	1.0-2.0	0.10	0.32			
	13-18	10-18	1.35-1.55	0.60-6.00	0.06-0.07	Low	0.5-1.0	0.10	0.32			
	18-28	---	---	---	---		---	---	---			
296D:												
Borky-----------	0-3	20-27	1.15-1.35	0.60-2.00	0.09-0.11	Low	2.0-4.0	0.17	0.43	3	8	---
	3-11	35-50	1.25-1.45	0.06-0.20	0.07-0.08	High	1.0-2.0	0.15	---			
	11-33	35-45	1.30-1.50	0.06-0.20	0.07-0.08	Moderate	0.0-1.0	0.15	---			
	33-60	---	---	---	---		---	---	---			
Sinnigam--------	0-5	27-35	1.10-1.30	0.20-0.60	0.10-0.12	Moderate	2.0-4.0	0.10	0.24	1	8	---
	5-17	35-50	1.25-1.50	0.20-0.60	0.07-0.08	Moderate	0.5-2.0	0.05	0.32			
	17-27	---	---	---	---		---	---	---			

Chemical Properties of the Soils

(Absence of an entry indicates that the data were not available or were not estimated.)

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1E:								
Badland.								
2E:								
Rock outcrop.								
3A:								
Riverwash.								
5A:								
Harlake---------	0-5	40-55	30.0-35.0	6.6-8.4	1-5	---	0-4	0-4
	5-60	35-60	25.0-35.0	7.4-8.4	5-10	---	0-4	4-10
6A:								
Harlake---------	0-5	40-55	30.0-35.0	7.4-8.4	1-5	---	2-4	---
	5-60	35-55	25.0-30.0	7.4-8.4	5-10	---	2-4	---
7A:								
Lostriver-------	0-3	40-55	30.0-40.0	7.4-9.4	0-5	---	2-8	8-13
	3-7	35-55	25.0-35.0	7.4-9.6	0-5	---	4-16	13-20
	7-60	35-55	25.0-35.0	7.4-9.6	5-10	2-5	8-16	13-30
7B:								
Lostriver-------	0-3	40-55	30.0-40.0	7.4-9.4	0-5	---	2-8	8-13
	3-7	35-55	25.0-35.0	7.4-9.6	0-5	---	4-16	13-20
	7-60	35-55	25.0-35.0	7.4-9.6	5-10	2-5	8-16	13-30
Bullhook--------	0-5	15-27	10.0-25.0	7.4-9.4	0-5	---	2-8	8-13
	5-11	18-35	10.0-30.0	7.4-9.6	5-10	---	4-16	13-20
	11-60	18-35	10.0-30.0	7.4-9.6	5-10	2-5	8-16	13-30
8A:								
Harlake---------	0-5	40-55	30.0-35.0	7.4-8.4	1-5	---	2-4	---
	5-60	35-55	25.0-30.0	7.4-8.4	5-10	---	2-4	---
Havre-----------	0-6	10-22	15.0-20.0	7.4-8.4	1-5	---	0-2	---
	6-60	18-30	15.0-25.0	7.4-8.4	1-5	---	0-4	---
8B:								
Harlake---------	0-5	40-55	30.0-35.0	6.6-8.4	1-5	---	0-4	0-4
	5-60	35-60	25.0-35.0	7.4-8.4	5-10	---	0-4	4-10
Havre-----------	0-6	15-27	15.0-20.0	6.1-8.4	1-5	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
9A:								
Havre-----------	0-6	15-27	15.0-20.0	6.1-8.4	1-5	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
9B:								
Havre-----------	0-6	10-22	15.0-20.0	7.4-8.4	1-5	---	0-2	---
	6-60	18-30	15.0-25.0	7.4-8.4	1-5	---	0-4	---
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
10A:								
Havre-----------	0-6	10-22	15.0-20.0	7.4-8.4	1-5	---	0-2	---
	6-60	18-30	15.0-25.0	7.4-8.4	1-5	---	0-4	---
11A:								
Havre-----------	0-6	15-27	15.0-20.0	6.1-8.4	1-5	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
Glendive--------	0-8	5-15	10.0-15.0	6.6-9.0	---	---	0-4	---
	8-14	5-18	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	14-60	5-18	10.0-15.0	7.4-9.0	5-10	---	2-8	---
11B:								
Havre-----------	0-6	10-22	15.0-20.0	7.4-8.4	1-5	---	0-2	---
	6-60	18-30	15.0-25.0	7.4-8.4	1-5	---	0-4	---
Glendive--------	0-8	5-15	10.0-15.0	6.6-9.0	1-5	---	0-4	---
	8-14	5-18	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	14-60	5-18	10.0-15.0	7.4-9.0	5-10	---	2-8	---
12A:								
Havre-----------	0-6	10-22	15.0-20.0	7.4-8.4	1-5	---	0-2	---
	6-60	18-30	15.0-25.0	7.4-8.4	1-5	---	0-4	---
Harlake---------	0-5	35-50	25.0-30.0	7.4-8.4	1-5	---	2-4	---
	5-15	35-50	20.0-25.0	7.4-8.4	5-10	---	2-4	---
	15-60	35-50	20.0-25.0	7.4-8.4	5-10	---	2-4	---
13A:								
Havre-----------	0-6	15-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-9.0	5-10	---	0-4	---
14A:								
Havre-----------	0-6	15-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-9.0	5-10	---	0-4	---
Glendive--------	0-8	5-15	10.0-15.0	6.6-9.0	---	---	0-4	---
	8-14	5-18	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	14-60	5-18	10.0-15.0	7.4-9.0	5-10	---	2-8	---
14B:								
Havre-----------	0-6	15-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-9.0	5-10	---	0-4	---
Glendive--------	0-8	5-15	10.0-15.0	6.6-9.0	1-5	---	0-4	---
	8-14	5-18	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	14-60	5-18	10.0-15.0	7.4-9.0	5-10	---	2-8	---
15A:								
Havre-----------	0-6	15-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-9.0	5-10	---	0-4	---
Harlake---------	0-5	40-50	30.0-35.0	7.4-8.4	5-10	---	0-4	0-4
	5-60	35-60	25.0-35.0	7.4-8.4	5-10	---	0-4	4-10
16A:								
Havre-----------	0-4	15-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	4-60	18-35	15.0-25.0	7.4-9.0	5-10	---	0-4	---
Yamacall--------	0-5	18-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-28	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	28-60	10-27	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
17A:								
Harlake----------	0-5	40-50	30.0-35.0	7.4-8.4	5-10	---	0-4	0-4
	5-60	35-60	25.0-35.0	7.4-8.4	5-10	---	0-4	4-10
Havre------------	0-6	15-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-60	18-35	15.0-25.0	7.4-9.0	5-10	---	0-4	---
20B:								
Harlake----------	0-5	40-55	30.0-35.0	7.4-8.4	1-5	---	2-4	---
	5-60	35-55	25.0-30.0	7.4-8.4	5-10	---	2-4	---
Marvan-----------	0-2	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	2-17	45-60	25.0-30.0	7.9-9.0	5-10	---	2-4	4-13
	17-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	4-16	13-38
Vanda------------	0-2	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	20-30
	2-12	35-60	20.0-30.0	7.9-9.6	1-5	---	8-16	13-30
	12-60	35-60	20.0-30.0	7.9-9.6	1-5	1-5	8-16	13-30
21A:								
McKenzie---------	0-4	40-60	25.0-30.0	6.6-9.0	1-5	---	2-8	---
	4-25	40-60	20.0-25.0	6.6-9.0	3-15	0-2	2-8	---
	25-60	40-60	20.0-25.0	7.9-9.0	3-15	0-4	2-8	---
22B:								
Nobe-------------	0-1	27-40	20.0-25.0	6.6-8.4	1-5	---	4-8	10-15
	1-60	35-60	25.0-30.0	7.9-9.6	1-5	2-5	16-32	15-70
Absher-----------	0-1	40-55	25.0-30.0	6.6-8.4	---	---	4-8	1-5
	1-6	35-60	25.0-30.0	6.6-8.4	---	---	8-16	18-70
	6-60	35-50	20.0-25.0	7.9-9.6	4-15	1-5	16-32	18-70
23A:								
Gerdrum----------	0-3	20-27	15.0-20.0	6.6-7.8	---	---	0-2	---
	3-10	35-55	25.0-35.0	7.4-9.0	---	---	2-8	10-20
	10-23	35-55	25.0-35.0	7.4-9.0	5-15	---	2-8	13-20
	23-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30
Vanda------------	0-2	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	20-30
	2-12	35-60	20.0-30.0	7.9-9.6	1-5	---	8-16	13-30
23B:								
Gerdrum----------	0-3	20-27	15.0-20.0	6.6-7.8	---	---	0-2	---
	3-10	35-55	25.0-35.0	7.4-9.0	---	---	2-8	10-20
	10-23	35-55	25.0-35.0	7.4-9.0	5-15	---	2-8	13-20
	23-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30
Vanda------------	0-2	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	20-30
	2-60	35-60	20.0-30.0	7.9-9.6	1-5	1-5	8-16	13-30
Creed------------	0-5	20-27	15.0-20.0	6.1-8.4	---	---	0-4	---
	5-10	35-55	25.0-35.0	6.6-9.0	---	---	2-4	8-13
	10-35	27-45	20.0-30.0	7.9-9.0	5-15	0-2	4-8	13-20
	35-60	25-35	15.0-20.0	7.9-9.0	5-10	1-5	4-16	13-25
23C:								
Gerdrum----------	0-3	20-27	15.0-20.0	6.6-7.8	---	---	0-2	---
	3-10	35-55	25.0-35.0	7.4-9.0	---	---	2-8	10-20
	10-23	35-55	25.0-35.0	7.4-9.0	5-15	---	2-8	13-20
	23-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
23C: (cont.)								
Creed-----------	0-5	20-27	15.0-20.0	6.1-8.4	---	---	0-4	---
	5-10	35-55	25.0-35.0	6.6-9.0	---	---	2-4	8-13
	10-35	27-45	20.0-30.0	7.9-9.0	5-15	0-2	4-8	13-20
	35-60	25-35	15.0-20.0	7.9-9.0	5-10	1-5	4-16	13-25
25A:								
Vanda-----------	0-2	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	20-30
	2-12	35-60	20.0-30.0	7.9-9.6	1-5	---	8-16	13-30
	12-60	35-60	20.0-30.0	7.9-9.6	1-5	1-5	8-16	13-30
26A:								
Weingart--------	0-2	18-27	30.0-35.0	5.6-7.8	---	---	0-2	10-20
	2-14	35-60	30.0-35.0	6.6-9.6	---	---	2-8	10-30
	14-21	35-55	30.0-35.0	7.9-9.6	5-15	0-1	4-16	13-30
	21-32	35-55	30.0-35.0	7.9-9.6	2-12	1-5	4-16	13-30
	32-60	---	---	---	---	---	---	---
26B:								
Weingart--------	0-2	18-27	30.0-35.0	5.6-7.8	---	---	0-2	10-20
	2-14	35-60	30.0-35.0	6.6-9.6	---	---	2-8	10-30
	14-21	35-55	30.0-35.0	7.9-9.6	5-15	0-1	4-16	13-30
	21-32	35-55	30.0-35.0	7.9-9.6	2-12	1-5	4-16	13-30
	32-60	---	---	---	---	---	---	---
Warhorse--------	0-3	18-27	15.0-20.0	6.6-7.8	---	---	0-2	---
	3-12	35-45	20.0-30.0	6.6-7.8	---	---	0-2	---
	12-16	30-40	15.0-25.0	6.6-8.4	0-5	---	0-4	---
	16-60	---	---	---	---	---	---	---
30C:								
Busby-----------	0-6	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	6-13	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	13-43	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
	43-60	3-18	5.0-10.0	7.9-8.4	5-15	1-2	0-4	---
30D:								
Busby-----------	0-6	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	6-13	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	13-43	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
	43-60	3-18	5.0-10.0	7.9-8.4	5-15	1-2	0-4	---
31B:								
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
31C:								
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
32B:								
Twilight--------	0-3	5-18	10.0-15.0	6.6-7.8	---	---	---	---
	3-11	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	11-35	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	35-60	---	---	---	---	---	---	---
32D:								
Twilight--------	0-3	5-18	10.0-15.0	6.6-7.8	---	---	---	---
	3-11	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	11-35	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	35-60	---	---	---	---	---	---	---
Blacksheep------	0-4	5-15	10.0-15.0	7.4-8.4	---	---	---	---
	4-18	5-15	10.0-15.0	7.9-8.4	5-10	---	0-2	---
	18-60	---	---	---	---	---	---	---
Rock outcrop.								
33A:								
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
33B:								
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
34A:								
Yamacall--------	0-7	27-30	15.0-20.0	6.6-8.4	---	---	---	---
	7-14	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	14-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
34B:								
Yamacall--------	0-7	27-30	15.0-20.0	6.6-8.4	---	---	---	---
	7-14	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	14-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
35B:								
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
Busby-----------	0-6	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	6-13	10-18	10.0-15.0	7.4-8.4	---	---	---	---
	13-43	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
	43-60	3-18	5.0-10.0	7.9-8.4	5-15	1-2	0-4	---
36B:								
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
37A:								
Yamacall--------	0-7	27-35	15.0-20.0	7.4-8.4	5-10	---	---	---
	7-14	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
37B:								
Yamacall--------	0-7	27-35	15.0-20.0	7.4-8.4	5-10	---	---	---
	7-14	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	14-60	10-27	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5
38A:								
Kobase----------	0-6	27-40	25.0-30.0	6.6-8.4	0-5	---	0-2	1-4
	6-24	35-45	20.0-25.0	7.4-8.4	5-15	---	0-2	0-10
	24-60	35-45	20.0-25.0	7.9-9.0	5-15	0-5	0-4	8-13
Zatoville-------	0-2	30-40	20.0-25.0	7.4-9.0	---	---	0-2	---
	2-13	33-45	15.0-20.0	7.4-9.0	1-5	---	0-4	---
	13-19	35-45	15.0-20.0	7.9-9.0	5-15	---	4-8	1-13
	19-60	35-45	15.0-20.0	7.9-9.0	5-10	10-20	8-16	18-30
38B:								
Zatoville-------	0-2	30-40	20.0-25.0	7.4-9.0	---	---	0-2	---
	2-13	33-45	15.0-20.0	7.4-9.0	1-5	---	0-4	---
	13-19	35-45	15.0-20.0	7.9-9.0	5-15	---	4-8	1-13
	19-60	35-45	15.0-20.0	7.9-9.0	5-10	10-20	8-16	18-30
39B:								
Delpoint--------	0-3	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	3-15	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
39C:								
Delpoint--------	0-3	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	3-15	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
40B:								
Kobase----------	0-6	27-40	25.0-30.0	6.6-8.4	0-5	---	0-2	1-4
	6-24	35-45	20.0-25.0	7.4-8.4	5-15	---	0-2	0-10
	24-60	35-45	20.0-25.0	7.9-9.0	5-15	0-5	0-4	8-13
40C:								
Kobase----------	0-6	27-40	25.0-30.0	7.4-8.4	5-10	---	0-2	1-5
	6-24	35-45	20.0-25.0	7.4-8.4	5-15	---	0-2	0-10
	24-60	35-45	20.0-25.0	7.9-9.0	5-15	0-5	0-4	8-13
41A:								
Yamacall--------	0-5	18-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-28	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	28-60	10-27	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5
41B:								
Yamacall--------	0-3	18-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	3-25	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	25-60	10-27	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
41C:								
Yamacall---------	0-5	18-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	5-28	18-35	10.0-15.0	7.9-9.0	10-15	0-1	0-4	1-5
	28-60	10-27	10.0-15.0	7.9-9.0	5-10	---	0-4	1-5
Delpoint---------	0-3	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	3-10	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	10-22	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	22-60	---	---	---	---	---	---	---
50B:								
Hinterland-------	0-3	20-27	20.0-25.0	6.6-7.8	---	---	---	---
	3-12	27-45	20.0-30.0	6.6-7.8	---	---	---	---
	12-22	---	---	---	---	---	---	---
50C:								
Hinterland-------	0-3	20-27	20.0-25.0	6.6-7.8	---	---	---	---
	3-12	27-45	20.0-30.0	6.6-7.8	---	---	---	---
	12-22	---	---	---	---	---	---	---
50D:								
Hinterland-------	0-3	20-27	20.0-25.0	6.6-7.8	---	---	---	---
	3-12	27-45	20.0-30.0	6.6-7.8	---	---	---	---
	12-22	---	---	---	---	---	---	---
Delplain---------	0-3	27-40	20.0-25.0	6.1-7.8	---	---	---	---
	3-12	35-45	20.0-25.0	6.1-7.8	---	---	---	---
	12-22	---	---	---	---	---	---	---
51A:								
Ethridge---------	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-14	35-45	25.0-30.0	6.6-8.4	---	---	---	---
	14-25	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	25-60	25-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
51B:								
Ethridge---------	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-14	35-45	25.0-30.0	6.6-8.4	---	---	---	---
	14-25	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	25-60	25-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
52A:								
Eapa-------------	0-5	20-27	20.0-25.0	6.1-7.8	---	---	0-2	---
	5-15	24-34	20.0-25.0	6.1-7.8	---	---	0-2	---
	15-32	20-33	30.0-40.0	6.6-8.4	5-15	0-1	0-2	0-5
	32-60	18-30	30.0-40.0	7.4-8.4	5-15	0-1	0-4	0-5
52B:								
Eapa-------------	0-5	20-27	20.0-25.0	6.1-7.8	---	---	0-2	---
	5-15	24-34	20.0-25.0	6.1-7.8	---	---	0-2	---
	15-32	20-33	30.0-40.0	6.6-8.4	5-15	0-1	0-2	0-5
	32-60	18-30	30.0-40.0	7.4-8.4	5-15	0-1	0-4	0-5
53A:								
Tanna------------	0-4	20-27	20.0-25.0	6.6-7.8	---	---	---	---
	4-12	35-50	25.0-30.0	6.6-8.4	---	---	0-4	---
	12-25	15-40	15.0-25.0	7.4-9.0	5-15	---	2-4	---
	25-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
54A:								
Marmarth--------	0-4	10-18	10.0-15.0	6.1-7.3	---	---	---	---
	4-8	18-35	15.0-20.0	6.1-7.8	---	---	---	---
	8-31	15-30	10.0-15.0	7.4-8.4	5-15	---	---	---
	31-60	---	---	---	---	---	---	---
56A:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
Musselshell-----	0-4	20-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	4-20	10-27	10.0-15.0	7.9-9.0	40-60	---	0-2	---
	20-60	10-18	5.0-10.0	7.9-9.0	40-60	---	0-2	---
Attewan---------	0-5	10-20	5.0-10.0	6.6-8.4	---	---	---	---
	5-14	20-35	15.0-20.0	6.6-8.4	---	---	---	---
	14-26	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	26-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-2	---
57A:								
Attewan---------	0-5	10-20	5.0-10.0	6.6-8.4	---	---	---	---
	5-14	20-35	15.0-20.0	6.6-8.4	---	---	---	---
	14-26	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	26-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-2	---
57B:								
Attewan---------	0-2	10-20	10.0-15.0	6.6-7.3	---	---	---	---
	2-14	20-35	15.0-20.0	6.6-7.8	---	---	---	---
	14-26	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	26-60	0-10	1.0-5.0	7.4-8.4	1-15	---	0-2	---
57C:								
Attewan---------	0-5	10-20	5.0-10.0	6.6-8.4	---	---	---	---
	5-14	20-35	15.0-20.0	6.6-8.4	---	---	---	---
	14-26	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	26-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-2	---
Niart-----------	0-6	20-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-24	20-30	10.0-15.0	7.9-9.0	40-55	---	0-2	---
	24-60	15-25	5.0-10.0	7.9-9.0	40-55	---	0-2	---
58A:								
Verson----------	0-4	27-40	20.0-25.0	6.1-7.3	---	---	---	---
	4-9	35-55	25.0-35.0	6.1-7.8	---	---	---	---
	9-22	35-50	20.0-30.0	7.4-8.4	5-15	---	---	---
	22-60	5-25	5.0-10.0	7.4-8.4	5-15	---	0-2	---
60B:								
Abor------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-32	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	32-60	---	---	---	---	---	---	---
60C:								
Abor------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-32	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	32-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
60C: (cont.)								
Neldore---------	0-3	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	3-6	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	6-14	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	14-60	---	---	---	---	---	---	---
60D:								
Neldore---------	0-3	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	3-6	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	6-14	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	14-60	---	---	---	---	---	---	---
Abor------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-32	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	32-60	---	---	---	---	---	---	---
60E:								
Neldore---------	0-2	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	2-9	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	9-17	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	17	---	---	---	---	---	---	---
Abor------------	0-2	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	0-2
	2-24	35-60	25.0-40.0	7.4-8.4	5-15	---	0-4	---
	24	---	---	---	---	---	---	---
61D:								
Neldore---------	0-3	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	3-5	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	5-11	40-60	30.0-35.0	5.6-7.8	---	1-3	0-4	---
	11-60	---	---	---	---	---	---	---
Neldore, saline-	0-4	45-60	30.0-35.0	7.4-8.4	---	---	2-4	---
	4-18	45-60	30.0-35.0	7.4-8.4	---	1-3	4-8	---
	18-60	---	---	---	---	---	---	---
61E:								
Neldore---------	0-3	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	3-5	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	5-11	40-60	30.0-35.0	5.6-7.8	---	1-3	0-4	---
	11-60	---	---	---	---	---	---	---
Volborg---------	0-3	40-50	30.0-35.0	4.5-6.5	---	---	0-4	0-5
	3-17	35-50	30.0-35.0	3.6-5.5	---	---	2-8	0-13
	17-60	---	---	---	---	---	---	---
62C:								
Neldore---------	0-3	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	3-6	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	6-14	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	14-60	---	---	---	---	---	---	---
62D:								
Neldore---------	0-3	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	3-5	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	5-11	40-60	30.0-35.0	5.6-7.8	---	1-3	0-4	---
	11-60	---	---	---	---	---	---	---
Yawdim----------	0-2	40-50	25.0-30.0	6.6-7.8	---	---	---	---
	2-11	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	11-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
62E:								
Neldore----------	0-3	40-50	30.0-35.0	5.6-7.8	---	---	0-2	---
	3-5	40-60	30.0-35.0	5.6-7.8	---	---	0-4	---
	5-11	40-60	30.0-35.0	5.6-7.8	---	1-3	0-4	---
	11-60	---	---	---	---	---	---	---
Rock outcrop.								
63A:								
Marias-----------	0-4	40-60	30.0-35.0	7.4-8.4	1-5	---	0-4	1-4
	4-28	40-60	25.0-35.0	7.9-9.0	5-10	---	0-4	1-4
	28-60	40-60	25.0-30.0	7.9-9.0	5-10	1-6	2-8	4-13
64A:								
Marvan-----------	0-2	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	2-17	45-60	25.0-30.0	7.9-9.0	5-10	---	2-4	4-13
	17-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	4-16	13-38
Vanda------------	0-2	40-60	25.0-35.0	7.9-9.6	1-5	---	2-8	20-30
	2-12	35-60	20.0-30.0	7.9-9.6	1-5	---	8-16	13-30
	12-60	35-60	20.0-30.0	7.9-9.6	1-5	1-5	8-16	13-30
64B:								
Marvan-----------	0-2	40-60	25.0-30.0	7.4-8.4	1-5	---	0-4	0-4
	2-17	45-60	25.0-30.0	7.9-9.0	5-10	---	2-4	4-13
	17-60	45-60	25.0-30.0	7.9-9.0	5-10	1-5	4-16	13-38
67D:								
Yawdim-----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-11	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	11-60	---	---	---	---	---	---	---
68C:								
Megonot----------	0-10	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	10-18	35-45	20.0-25.0	7.4-8.4	1-15	---	0-4	---
	18-35	35-45	20.0-25.0	7.4-8.4	5-15	1-5	0-4	---
	35-60	---	---	---	---	---	---	---
Yawdim-----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-16	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	16-60	---	---	---	---	---	---	---
69C:								
Orinoco----------	0-3	30-40	25.0-30.0	7.4-8.4	5-10	---	---	---
	3-16	35-45	20.0-25.0	7.9-8.4	5-15	0-5	4-8	5-15
	16-24	35-45	20.0-25.0	6.6-8.4	1-5	1-5	8-16	15-30
	24-60	---	---	---	---	---	---	---
Yawdim-----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-16	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	16-60	---	---	---	---	---	---	---
73D:								
Yawdim-----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-16	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	16-60	---	---	---	---	---	---	---
Abor-------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-32	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	32-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
73E:								
Yawdim----------	0-2	40-50	25.0-30.0	6.6-7.8	---	---	---	---
	2-11	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	11-60	---	---	---	---	---	---	---
Abor------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-27	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	27-60	---	---	---	---	---	---	---
74D:								
Abor------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-32	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	32-60	---	---	---	---	---	---	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
74E:								
Abor------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-27	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	27-60	---	---	---	---	---	---	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
80E:								
Blacksheep------	0-4	5-15	10.0-15.0	7.4-8.4	---	---	---	---
	4-18	5-15	10.0-15.0	7.9-8.4	5-10	---	0-2	---
	18-60	---	---	---	---	---	---	---
Rock outcrop.								
Twilight--------	0-3	15-20	10.0-15.0	6.1-7.8	---	---	0-2	---
	3-11	10-18	5.0-10.0	6.1-7.8	0-3	---	0-2	---
	11-35	7-18	5.0-10.0	7.4-8.4	5-15	---	0-2	---
	35-60	---	---	---	---	---	---	---
81B:								
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
81C:								
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
81D:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
82B:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
82C:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Rock outcrop.								
82E:								
Cabbart---------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-11	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	11-22	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	22-60	---	---	---	---	---	---	---
Rock outcrop.								
83D:								
Cabbart---------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Rock outcrop.								
Blacksheep------	0-4	5-15	10.0-15.0	7.4-8.4	---	---	---	---
	4-18	5-15	10.0-15.0	7.9-8.4	5-10	---	0-2	---
	18-60	---	---	---	---	---	---	---
84C:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Yawdim----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-16	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	16-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
84C: (cont.)								
Delpoint---------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
84D:								
Cabbart----------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Yawdim-----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-11	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	11-60	---	---	---	---	---	---	---
Rock outcrop.								
84E:								
Cabbart----------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Yawdim-----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-11	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	11-60	---	---	---	---	---	---	---
Delpoint---------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-11	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	11-22	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	22-60	---	---	---	---	---	---	---
85A:								
Cabbart----------	0-4	27-32	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
86D:								
Cabbart----------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Rentsac----------	0-2	7-18	5.0-10.0	6.6-8.4	0-5	---	---	---
	2-12	7-18	5.0-10.0	7.4-8.4	5-15	---	0-4	---
	12-60	---	---	---	---	---	---	---
86E:								
Cabbart----------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Rock outcrop.								
87B:								
Delpoint---------	0-3	18-27	15.0-20.0	7.4-8.4	5-10	---	0-4	---
	3-11	18-35	15.0-20.0	7.9-8.4	5-10	---	0-4	---
	11-22	18-35	10.0-15.0	7.9-8.4	5-15	---	0-4	---
	22-60	---	---	---	---	---	---	---
Cabbart----------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
88D:								
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart---------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Rock outcrop.								
89C:								
Rentsac---------	0-2	7-18	5.0-10.0	6.6-8.4	0-5	---	---	---
	2-12	7-18	5.0-10.0	7.4-8.4	5-15	---	0-4	---
	12-22	---	---	---	---	---	---	---
90B:								
Chinook---------	0-4	5-18	10.0-15.0	6.6-8.4	---	---	0-2	---
	4-34	5-18	5.0-10.0	6.6-9.0	---	---	0-2	---
	34-60	5-18	5.0-10.0	6.6-9.0	3-15	---	0-2	---
91A:								
Kremlin---------	0-6	18-27	15.0-20.0	6.1-7.8	---	---	---	---
	6-15	18-30	10.0-15.0	6.6-7.8	---	---	---	---
	15-60	18-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
91B:								
Kremlin---------	0-6	18-27	15.0-20.0	6.1-7.8	---	---	---	---
	6-15	18-30	10.0-15.0	6.6-7.8	---	---	---	---
	15-60	18-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
92A:								
Binna-----------	0-6	15-27	15.0-20.0	7.4-8.4	0-5	---	---	---
	6-25	18-27	10.0-15.0	7.9-9.0	15-30	---	0-2	---
	25-60	0-10	1.0-5.0	7.9-9.0	5-20	---	0-2	---
93A:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
Musselshell-----	0-4	20-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	4-20	10-27	10.0-15.0	7.9-9.0	40-60	---	0-2	---
	20-60	10-18	5.0-10.0	7.9-9.0	40-60	---	0-2	---
93B:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-15.0	7.4-8.4	40-70	---	0-2	---
	10-21	15-30	5.0-10.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-15	1.0-5.0	7.4-8.4	20-50	---	0-2	---
94A:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
94E:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
95A:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-15.0	7.4-8.4	40-70	---	0-2	---
	10-21	15-30	5.0-10.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-15	1.0-5.0	7.4-8.4	20-50	---	0-2	---
Musselshell-----	0-4	20-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	4-20	10-27	10.0-15.0	7.9-9.0	40-60	---	0-2	---
	20-60	10-18	5.0-10.0	7.9-9.0	40-60	---	0-2	---
95B:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-15.0	7.4-8.4	40-70	---	0-2	---
	10-21	15-30	5.0-10.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-15	1.0-5.0	7.4-8.4	20-50	---	0-2	---
Attewan---------	0-5	10-20	10.0-15.0	6.6-7.3	---	---	---	---
	5-14	20-35	15.0-20.0	6.6-7.8	---	---	---	---
	14-26	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	26-60	0-10	1.0-5.0	7.4-8.4	1-15	---	0-2	---
Musselshell-----	0-4	20-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	4-20	10-27	10.0-15.0	7.9-9.0	40-60	---	0-2	---
	20-60	10-18	5.0-10.0	7.9-9.0	40-60	---	0-2	---
95C:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-15.0	7.4-8.4	40-70	---	0-2	---
	10-21	15-30	5.0-10.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-15	1.0-5.0	7.4-8.4	20-50	---	0-2	---
Attewan---------	0-5	10-20	10.0-15.0	6.6-7.3	---	---	---	---
	5-14	20-35	15.0-20.0	6.6-7.8	---	---	---	---
	14-26	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	26-60	0-10	1.0-5.0	7.4-8.4	1-15	---	0-2	---
95E:								
Yawdim----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-11	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	11-60	---	---	---	---	---	---	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
96E:								
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
Abor------------	0-3	40-55	30.0-40.0	7.4-8.4	1-5	---	0-4	---
	3-27	35-60	25.0-40.0	7.4-9.0	5-15	0-5	0-4	0-2
	27-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
97A:								
Musselshell-----	0-4	20-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	4-20	10-27	10.0-15.0	7.9-9.0	40-60	---	0-2	---
	20-60	10-18	5.0-10.0	7.9-9.0	40-60	---	0-2	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-15	20-35	10.0-15.0	7.4-8.4	40-70	---	0-2	---
	15-26	15-30	5.0-10.0	7.4-8.4	40-70	---	0-2	---
	26-60	0-15	1.0-5.0	7.4-8.4	20-50	---	0-2	---
97B:								
Musselshell-----	0-4	20-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	4-20	10-27	10.0-15.0	7.9-9.0	40-60	---	0-2	---
	20-60	10-18	5.0-10.0	7.9-9.0	40-60	---	0-2	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-15	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	15-26	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	26-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
98A:								
Niart-----------	0-6	20-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-24	20-30	10.0-15.0	7.9-9.0	40-55	---	0-2	---
	24-60	15-25	5.0-10.0	7.9-9.0	40-55	---	0-2	---
98B:								
Niart-----------	0-6	20-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-24	20-30	10.0-15.0	7.9-9.0	40-55	---	0-2	---
	24-60	15-25	5.0-10.0	7.9-9.0	40-55	---	0-2	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-15	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	15-22	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	22-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
98C:								
Niart-----------	0-6	20-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-24	20-30	10.0-15.0	7.9-9.0	40-55	---	0-2	---
	24-60	15-25	5.0-10.0	7.9-9.0	40-55	---	0-2	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-15	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	15-22	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	22-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
98D:								
Niart-----------	0-6	20-27	15.0-20.0	7.4-8.4	5-10	---	0-2	---
	6-24	20-30	10.0-15.0	7.9-9.0	40-55	---	0-2	---
	24-60	15-25	5.0-10.0	7.9-9.0	40-55	---	0-2	---
Rothiemay-------	0-7	15-27	15.0-20.0	7.4-8.4	1-5	---	---	---
	7-15	18-35	15.0-20.0	7.4-8.4	5-20	---	0-2	---
	15-60	18-35	10.0-20.0	7.9-9.0	15-60	---	0-4	---
123C:								
Creed-----------	0-5	20-27	15.0-20.0	6.1-8.4	---	---	0-4	---
	5-10	35-55	25.0-35.0	6.6-9.0	---	---	2-4	8-13
	10-35	27-45	20.0-30.0	7.9-9.0	5-15	0-2	4-8	13-20
	35-60	25-35	15.0-20.0	7.9-9.0	5-10	1-5	4-16	13-25

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
123C: (cont.)								
Gerdrum---------	0-3	20-27	15.0-20.0	6.6-7.8	---	---	0-2	---
	3-10	35-55	25.0-35.0	7.4-9.0	---	---	2-8	10-20
	10-23	35-55	25.0-35.0	7.4-9.0	5-15	---	2-8	13-20
	23-60	30-50	20.0-25.0	7.9-9.0	5-15	1-5	8-16	13-30
130B:								
Busby-----------	0-3	10-18	10.0-15.0	7.4-8.4	---	---	0	---
	3-14	10-18	10.0-15.0	7.4-8.4	---	---	0	---
	14-60	10-18	5.0-15.0	7.9-8.4	5-15	---	0-2	---
Twilight--------	0-3	5-18	10.0-15.0	6.6-7.8	---	---	0	---
	3-11	5-18	5.0-10.0	6.6-7.8	---	---	0	---
	11-29	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	29	---	---	---	---	---	---	---
131C:								
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
132B:								
Twilight--------	0-3	5-18	10.0-15.0	6.6-7.8	---	---	---	---
	3-11	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	11-35	5-18	5.0-10.0	7.4-8.4	5-10	---	0-4	---
	35-60	---	---	---	---	---	---	---
Blacksheep------	0-4	5-15	10.0-15.0	7.4-8.4	---	---	---	---
	4-18	5-15	10.0-15.0	7.9-8.4	5-10	---	0-2	---
	18-60	---	---	---	---	---	---	---
138B:								
Zatoville-------	0-2	30-40	20.0-25.0	7.4-9.0	---	---	0-2	---
	2-13	33-45	15.0-20.0	7.4-9.0	1-5	---	0-4	---
	13-19	35-45	15.0-20.0	7.9-9.0	5-15	---	4-8	1-13
	19-60	35-45	15.0-20.0	7.9-9.0	5-10	10-20	8-16	18-30
Orinoco---------	0-3	30-40	25.0-30.0	7.4-8.4	5-10	---	---	---
	3-16	35-45	20.0-25.0	7.9-8.4	5-15	0-5	4-8	5-15
	16-24	35-45	20.0-25.0	6.6-8.4	1-5	1-5	8-16	15-30
	24-60	---	---	---	---	---	---	---
140B:								
Kobase----------	0-6	27-40	25.0-30.0	6.6-8.4	0-5	---	0-2	1-4
	6-24	35-45	20.0-25.0	7.4-8.4	5-15	---	0-2	0-10
	24-60	35-45	20.0-25.0	7.9-9.0	5-15	0-5	0-4	8-13
Megonot---------	0-10	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	10-18	35-45	20.0-25.0	7.4-8.4	1-15	---	0-4	---
	18-35	35-45	20.0-25.0	7.4-8.4	5-15	1-5	0-4	---
	35-60	---	---	---	---	---	---	---
140C:								
Kobase----------	0-6	27-40	25.0-30.0	7.4-8.4	5-10	---	0-2	1-5
	6-24	35-45	20.0-25.0	7.4-8.4	5-15	---	0-2	0-10
	24-60	35-45	20.0-25.0	7.9-9.0	5-15	0-5	0-4	8-13

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
140C: (cont.)								
Megonot---------	0-10	35-45	25.0-30.0	6.6-7.8	---	---	---	---
	10-18	35-45	20.0-25.0	7.4-8.4	1-15	---	0-4	---
	18-35	35-45	20.0-25.0	7.4-8.4	5-15	1-5	0-4	---
	35-60	---	---	---	---	---	---	---
142A:								
Rothiemay-------	0-7	15-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	7-15	18-35	15.0-20.0	7.4-8.4	5-20	---	0-2	---
	15-60	18-35	10.0-15.0	7.9-9.0	15-60	---	0-4	---
142B:								
Rothiemay-------	0-7	15-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	7-15	18-35	15.0-20.0	7.4-8.4	5-20	---	0-2	---
	15-60	18-35	10.0-15.0	7.9-9.0	15-60	---	0-4	---
142C:								
Rothiemay-------	0-6	15-27	15.0-20.0	7.4-8.4	1-5	---	---	---
	6-15	18-35	15.0-20.0	7.4-8.4	5-20	---	0-2	---
	15-60	18-35	10.0-20.0	7.9-9.0	15-60	---	0-4	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-15	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	15-26	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	26-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
152A:								
Eapa------------	0-5	20-27	20.0-25.0	6.1-7.8	---	---	0-2	---
	5-15	24-34	20.0-25.0	6.1-7.8	---	---	0-2	---
	15-32	20-33	30.0-40.0	6.6-8.4	5-15	0-1	0-2	0-5
	32-60	18-30	30.0-40.0	7.4-8.4	5-15	0-1	0-4	0-5
Attewan---------	0-5	10-20	5.0-10.0	6.6-8.4	---	---	---	---
	5-14	20-35	15.0-20.0	6.6-8.4	---	---	---	---
	14-26	15-30	10.0-15.0	7.4-8.4	5-15	---	0-2	---
	26-60	0-10	1.0-5.0	7.4-8.4	5-10	---	0-2	---
153C:								
Tanna-----------	0-4	20-27	20.0-25.0	6.6-7.8	---	---	---	---
	4-12	35-50	25.0-30.0	6.6-8.4	---	---	0-4	---
	12-25	15-40	15.0-25.0	7.4-9.0	5-15	---	2-4	---
	25-60	---	---	---	---	---	---	---
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
153D:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Tanna-----------	0-4	20-27	20.0-25.0	6.6-7.8	---	---	---	---
	4-12	35-50	25.0-30.0	6.6-8.4	---	---	0-4	---
	12-25	15-40	15.0-25.0	7.4-9.0	5-15	---	2-4	---
	25-60	---	---	---	---	---	---	---
154C:								
Marmarth--------	0-4	10-20	10.0-15.0	6.1-7.3	---	---	---	---
	4-8	18-35	15.0-20.0	6.1-7.8	---	---	---	---
	8-31	15-30	10.0-15.0	7.4-8.4	5-15	---	---	---
	31-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
154C: (cont.)								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
154D:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Marmarth--------	0-4	10-18	10.0-15.0	6.1-7.3	---	---	---	---
	4-8	18-35	15.0-20.0	6.1-7.8	---	---	---	---
	8-31	15-30	10.0-15.0	7.4-8.4	5-15	---	---	---
	31-60	---	---	---	---	---	---	---
158A:								
Ethridge--------	0-6	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	6-14	35-45	25.0-30.0	6.6-8.4	---	---	---	---
	14-25	30-45	20.0-25.0	7.4-8.4	5-15	---	---	1-5
	25-60	25-40	20.0-25.0	7.4-8.4	5-15	1-3	2-4	1-5
Verson----------	0-4	27-40	20.0-25.0	6.1-7.3	---	---	---	---
	4-9	35-55	25.0-35.0	6.1-7.8	---	---	---	---
	9-22	35-50	20.0-30.0	7.4-8.4	5-15	---	---	---
	22-60	5-25	5.0-10.0	7.4-8.4	5-15	---	0-2	---
167D:								
Yawdim----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-16	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	16-60	---	---	---	---	---	---	---
Orinoco---------	0-3	30-40	25.0-30.0	7.4-8.4	5-10	---	---	---
	3-16	35-45	20.0-25.0	7.9-8.4	5-15	0-5	4-8	5-15
	16-24	35-45	20.0-25.0	6.6-8.4	1-5	1-5	8-16	15-30
	24-60	---	---	---	---	---	---	---
167E:								
Yawdim----------	0-2	27-40	20.0-25.0	6.6-7.8	---	---	---	---
	2-11	35-50	20.0-25.0	7.4-8.4	5-10	---	---	---
	11-60	---	---	---	---	---	---	---
Orinoco---------	0-3	30-40	25.0-30.0	7.4-8.4	5-10	---	---	---
	3-16	35-45	20.0-25.0	7.9-8.4	5-15	0-5	4-8	5-15
	16-24	35-45	20.0-25.0	6.6-8.4	1-5	1-5	8-16	15-30
	24-60	---	---	---	---	---	---	---
181D:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
181E:								
Cabbart---------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Crago-----------	0-4	15-27	10.0-15.0	7.4-8.4	5-15	---	---	---
	4-10	20-35	10.0-20.0	7.4-8.4	40-70	---	0-2	---
	10-21	18-30	5.0-15.0	7.4-8.4	40-70	---	0-2	---
	21-60	0-20	0.0-5.0	7.4-8.4	20-50	---	0-2	---
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	0-4	---
	3-10	18-35	15.0-20.0	6.6-8.4	5-10	---	0-4	---
	10-22	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	22-60	---	---	---	---	---	---	---
189C:								
Rentsac---------	0-2	7-18	5.0-10.0	6.6-8.4	0-5	---	---	---
	2-12	7-18	5.0-10.0	7.4-8.4	5-15	---	0-4	---
	12-22	---	---	---	---	---	---	---
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
189E:								
Rentsac---------	0-2	7-18	5.0-10.0	6.6-8.4	0-5	---	---	---
	2-12	7-18	5.0-10.0	7.4-8.4	5-15	---	0-4	---
	12-22	---	---	---	---	---	---	---
Rock outcrop.								
230C:								
Macar-----------	0-5	18-27	15.0-20.0	6.6-8.4	---	---	0-2	---
	5-16	18-35	15.0-20.0	6.6-8.4	---	---	0-2	---
	16-29	18-35	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	29-60	15-30	10.0-15.0	7.4-9.0	5-12	---	0-2	---
232E:								
Hughesville-----	0-10	27-35	20.0-25.0	6.6-8.4	0-5	---	---	---
	10-22	18-35	10.0-15.0	7.4-8.4	40-50	---	---	---
	22-38	18-35	10.0-15.0	7.9-9.0	50-60	---	---	---
	38-48	---	---	---	---	---	---	---
Tibs------------	0-6	30-40	20.0-25.0	6.1-8.4	0-5	---	---	---
	6-30	35-55	20.0-30.0	6.6-8.4	5-10	---	---	---
	30-60	35-55	15.0-25.0	7.9-8.4	5-10	---	0-2	---
Whitecow--------	0-6	18-27	15.0-20.0	7.4-8.4	0-5	---	0-2	---
	6-20	18-35	10.0-15.0	7.4-9.0	35-50	---	0-2	---
	20-60	18-35	10.0-15.0	7.4-9.0	40-50	---	0-2	---
234F:								
Tibs------------	0-6	30-40	20.0-25.0	6.1-8.4	0-5	---	---	---
	6-30	35-55	20.0-30.0	6.6-8.4	5-10	---	---	---
	30-60	35-55	15.0-25.0	7.9-8.4	5-10	---	0-2	---
Whitecow--------	0-6	27-35	20.0-25.0	7.4-8.4	0-5	---	0-2	---
	6-20	18-35	10.0-15.0	7.4-9.0	35-50	---	0-2	---
	20-60	18-35	10.0-15.0	7.4-9.0	40-50	---	0-2	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
240E:								
Ridge-----------	0-4	5-20	5.0-15.0	7.4-7.8	0-5	---	---	---
	4-16	5-20	5.0-10.0	7.4-8.4	5-15	---	0-2	---
	16-60	---	---	---	---	---	---	---
Dast------------	0-5	2-18	10.0-15.0	7.4-8.4	0-5	---	---	---
	5-33	2-18	5.0-10.0	7.4-8.4	5-15	---	---	---
	33-60	---	---	---	---	---	---	---
Rock outcrop.								
241E:								
Twilight--------	0-3	5-18	5.0-15.0	6.6-7.8	---	---	---	---
	3-11	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	11-28	5-18	5.0-10.0	7.4-8.4	5-15	---	0-4	---
	28-60	---	---	---	---	---	---	---
Blacksheep------	0-4	5-15	10.0-15.0	7.4-8.4	---	---	---	---
	4-18	5-15	10.0-15.0	7.9-8.4	5-10	---	0-2	---
	18-60	---	---	---	---	---	---	---
Rock outcrop.								
242D:								
Dast------------	0-6	2-18	10.0-15.0	7.4-8.4	0-5	---	---	---
	6-37	2-18	5.0-10.0	7.4-8.4	5-15	---	---	---
	37-60	---	---	---	---	---	---	---
Ridge-----------	0-5	5-20	5.0-15.0	7.4-7.8	0-5	---	---	---
	5-18	5-20	5.0-10.0	7.4-8.4	5-15	---	0-2	---
	18-60	---	---	---	---	---	---	---
242F:								
Ridge-----------	0-4	5-20	5.0-15.0	7.4-7.8	0-5	---	---	---
	4-16	5-20	5.0-10.0	7.4-8.4	5-15	---	0-2	---
	16-60	---	---	---	---	---	---	---
Dast------------	0-5	2-18	10.0-15.0	7.4-8.4	0-5	---	---	---
	5-33	2-18	5.0-10.0	7.4-8.4	5-15	---	---	---
	33-60	---	---	---	---	---	---	---
243F:								
Blacksheep------	0-4	5-15	10.0-15.0	7.4-8.4	---	---	---	---
	4-18	5-15	10.0-15.0	7.9-8.4	5-10	---	0-2	---
	18-60	---	---	---	---	---	---	---
Twilight--------	0-3	5-18	5.0-15.0	6.6-7.8	---	---	---	---
	3-11	5-18	5.0-10.0	6.6-7.8	---	---	---	---
	11-28	5-18	5.0-10.0	7.4-8.4	5-15	---	0-4	---
	28-60	---	---	---	---	---	---	---
245C:								
Lamedeer--------	0-5	12-23	20.0-25.0	6.1-7.3	---	---	---	---
	5-34	15-25	20.0-25.0	6.6-7.8	---	---	---	---
	34-60	8-20	15.0-20.0	7.4-8.4	5-15	---	0-2	---
Ringling--------	0-5	10-25	15.0-20.0	6.6-7.8	---	---	---	---
	5-14	10-25	10.0-15.0	6.6-7.8	---	---	---	---
	14-20	10-25	10.0-15.0	6.6-7.8	5-10	---	---	---
	20-60	0-5	0.0-2.0	6.6-8.4	5-10	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
245F:								
Lamedeer--------	0-5	12-23	20.0-25.0	6.1-7.3	---	---	---	---
	5-34	15-25	20.0-25.0	6.6-7.8	---	---	---	---
	34-60	8-20	15.0-20.0	7.4-8.4	5-15	---	0-2	---
Ringling--------	0-5	10-25	15.0-20.0	6.6-7.8	---	---	---	---
	5-14	10-25	10.0-15.0	6.6-7.8	---	---	---	---
	14-20	10-25	10.0-15.0	6.6-7.8	5-10	---	---	---
	20-60	0-5	0.0-2.0	6.6-8.4	5-10	---	---	---
246F:								
Lamedeer--------	0-5	12-23	20.0-25.0	6.1-7.3	---	---	---	---
	5-34	15-25	20.0-25.0	6.6-7.8	---	---	---	---
	34-60	8-20	15.0-20.0	7.4-8.4	5-15	---	0-2	---
Ringling--------	0-5	10-25	15.0-20.0	6.6-7.8	---	---	---	---
	5-14	10-25	10.0-15.0	6.6-7.8	---	---	---	---
	14-20	10-25	10.0-15.0	6.6-7.8	5-10	---	---	---
	20-60	0-5	0.0-2.0	6.6-8.4	5-10	---	---	---
250E:								
Macmeal---------	0-11	10-25	10.0-15.0	6.1-7.3	---	---	---	---
	11-36	27-35	15.0-20.0	6.1-7.3	---	---	---	---
	36-60	27-35	10.0-15.0	7.4-8.4	5-15	---	0-2	---
Rock outcrop.								
251C:								
Savage----------	0-5	18-27	15.0-20.0	6.1-7.8	---	---	---	---
	5-17	35-50	30.0-35.0	6.1-8.4	---	---	0-4	---
	17-60	30-45	25.0-30.0	7.4-8.4	5-15	---	0-4	---
252D:								
Hilger----------	0-4	15-27	20.0-25.0	6.6-7.8	---	---	---	---
	4-18	25-35	20.0-25.0	7.4-8.4	---	---	---	---
	18-30	15-35	10.0-15.0	7.9-8.4	15-30	---	0-2	---
	30-60	15-27	10.0-15.0	7.9-8.4	10-15	---	0-2	---
Rock outcrop.								
252E:								
Hilger----------	0-4	15-27	20.0-25.0	6.6-7.8	---	---	---	---
	4-18	25-35	20.0-25.0	7.4-8.4	---	---	---	---
	18-30	15-35	10.0-15.0	7.9-8.4	15-30	---	0-2	---
	30-60	15-27	10.0-15.0	7.9-8.4	10-15	---	0-2	---
254C:								
Fergus----------	0-6	27-35	20.0-25.0	6.6-7.8	---	---	---	---
	6-15	35-50	20.0-30.0	6.6-7.8	---	---	---	---
	15-60	27-45	15.0-20.0	7.4-9.0	5-15	---	0-4	---
255C:								
Shambo----------	0-7	10-27	15.0-20.0	6.6-7.8	---	---	---	---
	7-16	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	16-60	18-35	10.0-15.0	7.4-9.0	10-15	---	---	1-5
Korchea---------	0-6	18-27	15.0-20.0	6.6-8.4	1-5	---	---	---
	6-60	18-35	15.0-20.0	7.4-8.4	5-10	---	0-4	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
255C: (cont.)								
Barvon----------	0-10	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	10-29	20-30	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	29-60	---	---	---	---	---	---	---
255D:								
Barvon----------	0-10	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	10-29	20-30	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	29-60	---	---	---	---	---	---	---
Cabba-----------	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-17	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	17-60	---	---	---	---	---	---	---
Shambo----------	0-7	10-27	15.0-20.0	6.6-7.8	---	---	---	---
	7-16	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	16-60	18-35	10.0-15.0	7.4-9.0	10-15	---	---	1-5
256C:								
Yamacall--------	0-3	18-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-30	10.0-15.0	6.6-8.4	0-5	---	---	---
	11-60	18-30	10.0-15.0	7.9-9.0	5-15	0-1	0-4	1-5
Havre-----------	0-4	15-27	15.0-20.0	6.1-8.4	1-5	---	0-2	---
	4-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	---	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
260F:								
Kuro------------	0-3	30-40	20.0-30.0	6.6-7.8	1-5	---	---	---
	3-15	35-45	20.0-30.0	7.4-8.4	1-5	---	0-4	---
	15-60	---	---	---	---	---	---	---
Wayden----------	0-4	30-40	25.0-30.0	7.4-9.0	1-5	---	0-2	---
	4-17	35-50	20.0-30.0	7.4-9.0	5-10	---	0-8	---
	17-60	---	---	---	---	---	---	---
Rock outcrop.								
261F:								
Wayden----------	0-4	30-40	25.0-30.0	7.4-9.0	1-5	---	0-2	---
	4-17	35-50	20.0-30.0	7.4-9.0	5-10	---	0-8	---
	17-60	---	---	---	---	---	---	---
Castner---------	0-7	10-18	15.0-20.0	6.6-7.8	---	---	---	---
	7-13	10-18	10.0-15.0	6.6-8.4	3-15	---	---	---
	13-18	10-18	10.0-15.0	6.6-8.4	3-15	---	0-2	---
	18-60	---	---	---	---	---	---	---
262E:								
Wayden----------	0-4	30-40	25.0-30.0	7.4-9.0	1-5	---	0-2	---
	4-17	35-50	20.0-30.0	7.4-9.0	5-10	---	0-8	---
	17-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
262E: (cont.)								
Windham---------	0-6	27-35	20.0-25.0	7.4-8.4	5-10	---	---	---
	6-11	18-35	15.0-20.0	7.9-8.4	35-60	---	---	---
	11-22	18-35	15.0-20.0	7.9-8.4	40-60	---	---	---
	22-60	18-35	10.0-15.0	7.9-8.4	40-60	---	0-2	---
280D:								
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	---	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
280E:								
Castner---------	0-7	10-18	15.0-20.0	6.6-7.8	---	---	---	---
	7-13	10-18	10.0-15.0	6.6-8.4	3-15	---	---	---
	13-18	10-18	10.0-15.0	6.6-8.4	3-15	---	0-2	---
	18-60	---	---	---	---	---	---	---
Kuro------------	0-3	30-40	20.0-30.0	6.6-7.8	1-5	---	---	---
	3-15	35-45	20.0-30.0	7.4-8.4	1-5	---	0-4	---
	15-60	---	---	---	---	---	---	---
281D:								
Doney-----------	0-4	10-27	15.0-20.0	6.6-8.4	---	---	0-2	---
	4-26	18-30	10.0-15.0	7.9-9.0	5-15	---	2-4	---
	26-60	---	---	---	---	---	---	---
Cabba-----------	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-17	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	17-60	---	---	---	---	---	---	---
Macar-----------	0-5	18-27	15.0-20.0	6.6-8.4	---	---	0-2	---
	5-11	18-35	15.0-20.0	6.6-8.4	---	---	0-2	---
	11-28	18-35	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	28-60	15-30	10.0-15.0	7.4-9.0	5-12	---	0-2	---
281E:								
Castner---------	0-5	10-18	15.0-20.0	6.6-7.8	---	---	---	---
	5-10	10-18	10.0-15.0	6.6-8.4	3-15	---	---	---
	10-15	10-18	10.0-15.0	6.6-8.4	3-15	---	0-2	---
	15-25	---	---	---	---	---	---	---
Rock outcrop.								
282D:								
Castner---------	0-7	10-18	15.0-20.0	6.6-7.8	---	---	---	---
	7-13	10-18	10.0-15.0	6.6-8.4	3-15	---	---	---
	13-18	10-18	10.0-15.0	6.6-8.4	3-15	---	0-2	---
	18-60	---	---	---	---	---	---	---
283D:								
Barvon----------	0-10	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	10-29	20-30	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	29-60	---	---	---	---	---	---	---
Cabba-----------	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-17	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	17-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
283F:								
Cabba-----------	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-12	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	12-60	---	---	---	---	---	---	---
Rock outcrop.								
284D:								
Cabba-----------	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-17	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	17-60	---	---	---	---	---	---	---
Barvon----------	0-10	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	10-29	20-30	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	29-60	---	---	---	---	---	---	---
284F:								
Doney-----------	0-4	10-27	15.0-20.0	6.6-8.4	---	---	0-2	---
	4-24	18-30	10.0-15.0	7.9-9.0	5-15	---	2-4	---
	24-60	---	---	---	---	---	---	---
Wayden----------	0-4	30-40	25.0-30.0	7.4-9.0	1-5	---	0-2	---
	4-17	35-50	20.0-30.0	7.4-9.0	5-10	---	0-8	---
	17-60	---	---	---	---	---	---	---
285D:								
Cabba-----------	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-17	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	17-60	---	---	---	---	---	---	---
Doney-----------	0-4	10-27	15.0-20.0	6.6-8.4	---	---	0-2	---
	4-26	18-30	10.0-15.0	7.9-9.0	5-15	---	2-4	---
	26-60	---	---	---	---	---	---	---
285F:								
Cabba-----------	0-3	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-17	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	17-60	---	---	---	---	---	---	---
Doney-----------	0-4	10-27	15.0-20.0	6.6-8.4	---	---	0-2	---
	4-24	18-30	10.0-15.0	7.9-9.0	5-15	---	2-4	---
	24-60	---	---	---	---	---	---	---
286F:								
Cabbart---------	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Rock outcrop.								
287D:								
Delpoint--------	0-3	20-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	---	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart---------	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
287F:								
Cabbart	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Delpoint	0-3	20-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-35	15.0-20.0	6.6-8.4	5-10	---	---	---
	11-22	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	22-60	---	---	---	---	---	---	---
288D:								
Delpoint	0-3	20-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-15	18-35	15.0-20.0	6.6-8.4	5-10	---	---	---
	15-30	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	30-60	---	---	---	---	---	---	---
Cabbart	0-3	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	3-12	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	12-60	---	---	---	---	---	---	---
Havre	0-4	15-27	15.0-20.0	6.1-8.4	1-5	---	0-2	---
	4-60	18-35	15.0-25.0	7.4-8.4	1-5	---	0-4	---
288F:								
Cabbart	0-4	18-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	4-16	18-35	5.0-10.0	7.4-9.0	15-25	1-5	2-8	1-5
	16-60	---	---	---	---	---	---	---
Delpoint	0-3	20-27	15.0-20.0	6.6-8.4	---	---	---	---
	3-11	18-35	15.0-20.0	6.6-8.4	5-10	---	---	---
	11-22	18-35	10.0-15.0	7.9-9.0	5-15	---	0-4	---
	22-60	---	---	---	---	---	---	---
289D:								
Barvon	0-10	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	10-24	20-30	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	24-60	---	---	---	---	---	---	---
Cabba	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-12	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	12-60	---	---	---	---	---	---	---
Korchea	0-6	18-27	15.0-20.0	6.6-8.4	1-5	---	---	---
	6-60	18-35	15.0-20.0	7.4-8.4	5-10	---	0-4	---
289F:								
Cabba	0-2	10-27	10.0-15.0	7.4-9.0	5-10	---	0-4	---
	2-12	20-35	5.0-10.0	7.4-9.0	5-15	---	2-8	---
	12-60	---	---	---	---	---	---	---
Barvon	0-10	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	10-29	20-30	15.0-20.0	7.4-8.4	5-15	---	0-2	---
	29-60	---	---	---	---	---	---	---
291C:								
Windham	0-6	18-27	15.0-20.0	7.4-8.4	5-10	---	---	---
	6-11	18-35	15.0-20.0	7.9-8.4	35-60	---	---	---
	11-22	18-35	15.0-20.0	7.9-8.4	40-60	---	---	---
	22-60	18-35	10.0-15.0	7.9-8.4	40-60	---	0-2	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
292A:								
Straw-----------	0-21	10-27	15.0-25.0	6.6-8.4	0-5	---	0-2	---
	21-45	18-32	15.0-25.0	6.6-8.4	3-15	---	0-2	---
	45-60	5-20	10.0-15.0	7.4-8.4	2-12	---	0-2	---
Korchea---------	0-6	18-27	15.0-20.0	6.6-8.4	1-5	---	---	---
	6-60	18-35	15.0-20.0	7.4-8.4	5-10	---	0-4	---
294C:								
Shambo----------	0-7	10-27	15.0-20.0	6.6-7.8	---	---	---	---
	7-16	18-35	10.0-15.0	6.6-8.4	---	---	---	---
	16-60	18-35	10.0-15.0	7.4-9.0	10-15	---	---	1-5
295F:								
Bitton----------	0-15	15-27	15.0-20.0	6.6-8.4	---	---	0-2	---
	15-35	15-27	15.0-20.0	7.4-8.4	---	---	0-2	---
	35-60	10-25	5.0-10.0	7.4-8.4	5-15	---	0-2	---
Winifred--------	0-3	27-40	25.0-30.0	6.6-7.8	---	---	---	---
	3-12	35-50	30.0-35.0	7.4-8.4	1-5	---	0-2	---
	12-35	35-50	30.0-35.0	7.4-9.0	5-15	1-5	0-4	1-5
	35-60	---	---	---	---	---	---	---
Castner---------	0-7	10-18	15.0-20.0	6.6-7.8	---	---	---	---
	7-13	10-18	10.0-15.0	6.6-8.4	3-15	---	---	---
	13-18	10-18	10.0-15.0	6.6-8.4	3-15	---	0-2	---
	18-28	---	---	---	---	---	---	---
296D:								
Borky-----------	0-3	20-27	15.0-20.0	6.6-7.8	---	---	---	---
	3-11	35-50	20.0-30.0	6.6-7.8	---	---	---	---
	11-33	35-45	15.0-25.0	7.4-8.4	5-15	---	0-2	---
	33-60	---	---	---	---	---	---	---
Sinnigam--------	0-5	27-35	20.0-25.0	6.1-7.8	---	---	---	---
	5-17	35-50	20.0-30.0	6.1-7.8	---	---	---	---
	17-27	---	---	---	---	---	---	---

Water Features

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
1E:									
Badland.									
2E:									
Rock outcrop.									
3A:									
Riverwash.									
5A:									
Harlake	C	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
6A:									
Harlake	C	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
7A:									
Lostriver	C	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
7B:									
Lostriver	C	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Bullhook	C	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
8A:									
Harlake	C	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
Havre	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
8B:									
Harlake	C	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Havre	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
9A:									
Havre	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
9B:									
Havre	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
Yamacall	B	None	—	—	>6.0	—	—	—	—
10A:									
Havre	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
11A:									
Havre	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Glendive	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
11B:									
Havre	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
Glendive	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
12A:									
Havre	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
Harlake	D	Occasional	Brief	Mar-Jun	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
13A:									
Havre-----------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
14A:									
Havre-----------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Glendive--------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
14B:									
Havre-----------	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
Glendive--------	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
15A:									
Havre-----------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Harlake---------	C	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
16A:									
Havre-----------	B	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
17A:									
Harlake---------	C	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Havre-----------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
20B:									
Harlake---------	C	Occasional	Brief	Apr-Jun	>6.0	—	—	—	—
Marvan----------	D	None	—	—	>6.0	—	—	—	—
Vanda-----------	D	None	—	—	>6.0	—	—	—	—
21A:									
McKenzie--------	D	None	—	—	1.0-2.0	Perched	Mar-Jun	—	—
22B:									
Nobe------------	D	None	—	—	2.0-3.5	Apparent	Mar-Jun	—	—
Absher----------	D	None	—	—	>6.0	—	—	—	—
23A:									
Gerdrum---------	D	None	—	—	>6.0	—	—	—	—
Vanda-----------	D	None	—	—	>6.0	—	—	—	—
23B:									
Gerdrum---------	D	None	—	—	>6.0	—	—	—	—
Vanda-----------	D	None	—	—	>6.0	—	—	—	—
Creed-----------	C	None	—	—	>6.0	—	—	—	—
23C:									
Gerdrum---------	D	None	—	—	>6.0	—	—	—	—
Creed-----------	C	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
25A:									
Vanda	D	None	---	---	>6.0	---	---	---	---
26A:									
Weingart	D	None	---	---	>6.0	---	---	---	---
26B:									
Weingart	D	None	---	---	>6.0	---	---	---	---
Warhorse	D	None	---	---	>6.0	---	---	---	---
30C:									
Busby	B	None	---	---	>6.0	---	---	---	---
30D:									
Busby	B	None	---	---	>6.0	---	---	---	---
31B:									
Delpoint	C	None	---	---	>6.0	---	---	---	---
31C:									
Delpoint	C	None	---	---	>6.0	---	---	---	---
Cabbart	D	None	---	---	>6.0	---	---	---	---
Yamacall	B	None	---	---	>6.0	---	---	---	---
32B:									
Twilight	B	None	---	---	>6.0	---	---	---	---
32D:									
Twilight	B	None	---	---	>6.0	---	---	---	---
Blacksheep	C	None	---	---	>6.0	---	---	---	---
Rock outcrop.									
33A:									
Yamacall	B	None	---	---	>6.0	---	---	---	---
33B:									
Yamacall	B	None	---	---	>6.0	---	---	---	---
34A:									
Yamacall	B	None	---	---	>6.0	---	---	---	---
34B:									
Yamacall	B	None	---	---	>6.0	---	---	---	---
35B:									
Yamacall	B	None	---	---	>6.0	---	---	---	---
Busby	B	None	---	---	>6.0	---	---	---	---
36B:									
Yamacall	B	None	---	---	>6.0	---	---	---	---
Delpoint	C	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
37A:									
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
37B:									
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
38A:									
Kobase----------	C	None	—	—	>6.0	—	—	—	—
Zatoville-------	C	None	—	—	>6.0	—	—	—	—
38B:									
Zatoville-------	C	None	—	—	>6.0	—	—	—	—
39B:									
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
39C:									
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
40B:									
Kobase----------	C	None	—	—	>6.0	—	—	—	—
40C:									
Kobase----------	C	None	—	—	>6.0	—	—	—	—
41A:									
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
41B:									
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
41C:									
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
50B:									
Hinterland------	D	None	—	—	>6.0	—	—	—	—
50C:									
Hinterland------	D	None	—	—	>6.0	—	—	—	—
50D:									
Hinterland------	D	None	—	—	>6.0	—	—	—	—
Delplain--------	D	None	—	—	>6.0	—	—	—	—
51A:									
Ethridge--------	C	None	—	—	>6.0	—	—	—	—
51B:									
Ethridge--------	C	None	—	—	>6.0	—	—	—	—
52A:									
Eapa------------	B	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
52B:									
Eapa	B	None	—	—	>6.0	—	—	—	—
53A:									
Tanna	D	None	—	—	>6.0	—	—	—	—
54A:									
Marmarth	C	None	—	—	>6.0	—	—	—	—
56A:									
Crago	B	None	—	—	>6.0	—	—	—	—
Musselshell	B	None	—	—	>6.0	—	—	—	—
Attewan	B	None	—	—	>6.0	—	—	—	—
57A:									
Attewan	B	None	—	—	>6.0	—	—	—	—
57B:									
Attewan	B	None	—	—	>6.0	—	—	—	—
57C:									
Attewan	B	None	—	—	>6.0	—	—	—	—
Niart	B	None	—	—	>6.0	—	—	—	—
58A:									
Verson	C	None	—	—	>6.0	—	—	—	—
60B:									
Abor	D	None	—	—	>6.0	—	—	—	—
60C:									
Abor	D	None	—	—	>6.0	—	—	—	—
Neldore	D	None	—	—	>6.0	—	—	—	—
60D:									
Neldore	D	None	—	—	>6.0	—	—	—	—
Abor	D	None	—	—	>6.0	—	—	—	—
60E:									
Neldore	D	None	--	--	>6.0	--	--	--	--
Abor	D	None	--	--	>6.0	--	--	--	--
61D:									
Neldore	D	None	—	—	>6.0	—	—	—	—
Neldore, saline	D	None	—	—	>6.0	—	—	—	—
61E:									
Neldore	D	None	—	—	>6.0	—	—	—	—
Volborg	D	None	—	—	>6.0	—	—	—	—
62C:									
Neldore	D	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
62D:									
Neldore----------	D	None	—	—	>6.0	—	—	—	—
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
62E:									
Neldore----------	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
63A:									
Marias----------	D	None	—	—	>6.0	—	—	—	—
64A:									
Marvan----------	D	None	—	—	>6.0	—	—	—	—
Vanda-----------	D	None	—	—	>6.0	—	—	—	—
64B:									
Marvan----------	D	None	—	—	>6.0	—	—	—	—
67D:									
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
68C:									
Megonot---------	C	None	—	—	>6.0	—	—	—	—
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
69C:									
Orinoco---------	C	None	—	—	>6.0	—	—	—	—
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
73D:									
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
Abor------------	D	None	—	—	>6.0	—	—	—	—
73E:									
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
Abor------------	D	None	—	—	>6.0	—	—	—	—
74D:									
Abor------------	D	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
74E:									
Abor------------	D	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
80E:									
Blacksheep------	C	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
Twilight--------	B	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
81B:									
Delpoint	C	None	—	—	>6.0	—	—	—	—
Cabbart	D	None	—	—	>6.0	—	—	—	—
81C:									
Delpoint	C	None	—	—	>6.0	—	—	—	—
Cabbart	D	None	—	—	>6.0	—	—	—	—
81D:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
82B:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Delpoint	C	None	—	—	>6.0	—	—	—	—
82C:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Delpoint	C	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
82E:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Delpoint	C	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
83D:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
Blacksheep	C	None	—	—	>6.0	—	—	—	—
84C:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Yawdim	D	None	—	—	>6.0	—	—	—	—
Delpoint	C	None	—	—	>6.0	—	—	—	—
84D:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Yawdim	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
84E:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Yawdim	D	None	—	—	>6.0	—	—	—	—
Delpoint	C	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
85A:									
Cabbart---------	D	None	---	---	>6.0	---	---	---	---
86D:									
Cabbart---------	D	None	---	---	>6.0	---	---	---	---
Rentsac---------	D	None	---	---	>6.0	---	---	---	---
86E:									
Cabbart---------	D	None	---	---	>6.0	---	---	---	---
Rock outcrop.									
87B:									
Delpoint--------	C	None	---	---	>6.0	---	---	---	---
Cabbart---------	D	None	---	---	>6.0	---	---	---	---
88D:									
Delpoint--------	C	None	---	---	>6.0	---	---	---	---
Cabbart---------	D	None	---	---	>6.0	---	---	---	---
Rock outcrop.									
89C:									
Rentsac---------	D	None	---	---	>6.0	---	---	---	---
90B:									
Chinook---------	B	None	---	---	>6.0	---	---	---	---
91A:									
Kremlin---------	B	None	---	---	>6.0	---	---	---	---
91B:									
Kremlin---------	B	None	---	---	>6.0	---	---	---	---
92A:									
Binna-----------	B	None	---	---	>6.0	---	---	---	---
93A:									
Crago-----------	B	None	---	---	>6.0	---	---	---	---
Musselshell-----	B	None	---	---	>6.0	---	---	---	---
93B:									
Crago-----------	B	None	---	---	>6.0	---	---	---	---
94A:									
Crago-----------	B	None	---	---	>6.0	---	---	---	---
94E:									
Crago-----------	B	None	---	---	>6.0	---	---	---	---
95A:									
Crago-----------	B	None	---	---	>6.0	---	---	---	---
Musselshell-----	B	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
95B:									
Crago-----------	B	None	—	—	>6.0	—	—	—	—
Attewan---------	B	None	—	—	>6.0	—	—	—	—
Musselshell-----	B	None	—	—	>6.0	—	—	—	—
95C:									
Crago-----------	B	None	—	—	>6.0	—	—	—	—
Attewan---------	B	None	—	—	>6.0	—	—	—	—
95E:									
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
96E:									
Crago-----------	B	None	—	—	>6.0	—	—	—	—
Abor------------	D	None	—	—	>6.0	—	—	—	—
97A:									
Musselshell-----	B	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
97B:									
Musselshell-----	B	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
98A:									
Niart-----------	B	None	—	—	>6.0	—	—	—	—
98B:									
Niart-----------	B	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
98C:									
Niart-----------	B	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
98D:									
Niart-----------	B	None	—	—	>6.0	—	—	—	—
Rothiemay-------	C	None	—	—	>6.0	—	—	—	—
123C:									
Creed-----------	C	None	—	—	>6.0	—	—	—	—
Gerdrum---------	D	None	—	—	>6.0	—	—	—	—
130B:									
Busby-----------	B	None	--	--	>6.0	--	--	--	--
Twilight--------	B	None	--	--	>6.0	--	--	--	--

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
131C:									
Delpoint	C	None	—	—	>6.0	—	—	—	—
Yamacall	B	None	—	—	>6.0	—	—	—	—
132B:									
Twilight	B	None	—	—	>6.0	—	—	—	—
Blacksheep	C	None	—	—	>6.0	—	—	—	—
138B:									
Zatoville	C	None	—	—	>6.0	—	—	—	—
Orinoco	C	None	—	—	>6.0	—	—	—	—
140B:									
Kobase	C	None	—	—	>6.0	—	—	—	—
Megonot	C	None	—	—	>6.0	—	—	—	—
140C:									
Kobase	C	None	—	—	>6.0	—	—	—	—
Megonot	C	None	—	—	>6.0	—	—	—	—
142A:									
Rothiemay	C	None	—	—	>6.0	—	—	—	—
142B:									
Rothiemay	C	None	—	—	>6.0	—	—	—	—
142C:									
Rothiemay	C	None	—	—	>6.0	—	—	—	—
Crago	B	None	—	—	>6.0	—	—	—	—
152A:									
Eapa	B	None	—	—	>6.0	—	—	—	—
Attewan	B	None	—	—	>6.0	—	—	—	—
153C:									
Tanna	D	None	—	—	>6.0	—	—	—	—
Cabbart	D	None	—	—	>6.0	—	—	—	—
153D:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Tanna	D	None	—	—	>6.0	—	—	—	—
154C:									
Marmarth	C	None	—	—	>6.0	—	—	—	—
Cabbart	D	None	—	—	>6.0	—	—	—	—
154D:									
Cabbart	D	None	—	—	>6.0	—	—	—	—
Marmarth	C	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table and ponding: Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
158A:									
Ethridge--------	C	None	—	—	>6.0	—	—	—	—
Verson----------	C	None	—	—	>6.0	—	—	—	—
167D:									
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
Orinoco---------	C	None	—	—	>6.0	—	—	—	—
167E:									
Yawdim----------	D	None	—	—	>6.0	—	—	—	—
Orinoco---------	C	None	—	—	>6.0	—	—	—	—
181D:									
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
181E:									
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Crago-----------	B	None	—	—	>6.0	—	—	—	—
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
189C:									
Rentsac---------	D	None	—	—	>6.0	—	—	—	—
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
189E:									
Rentsac---------	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
230C:									
Macar-----------	B	None	—	—	>6.0	—	—	—	—
232E:									
Hughesville-----	C	None	—	—	>6.0	—	—	—	—
Tibs------------	C	None	—	—	>6.0	—	—	—	—
Whitecow--------	B	None	—	—	>6.0	—	—	—	—
234F:									
Tibs------------	C	None	—	—	>6.0	—	—	—	—
Whitecow--------	B	None	—	—	>6.0	—	—	—	—
240E:									
Ridge-----------	B	None	—	—	>6.0	—	—	—	—
Dast------------	B	None	—	—	>6.0	—	—	—	—
Rock outcrop.									

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
241E:									
Twilight--------	B	None	—	—	>6.0	—	—	—	—
Blacksheep------	C	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
242D:									
Dast------------	B	None	—	—	>6.0	—	—	—	—
Ridge-----------	B	None	—	—	>6.0	—	—	—	—
242F:									
Ridge-----------	B	None	—	—	>6.0	—	—	—	—
Dast------------	B	None	—	—	>6.0	—	—	—	—
243F:									
Blacksheep------	C	None	—	—	>6.0	—	—	—	—
Twilight--------	B	None	—	—	>6.0	—	—	—	—
245C:									
Lamedeer--------	B	None	—	—	>6.0	—	—	—	—
Ringling--------	A	None	—	—	>6.0	—	—	—	—
245F:									
Lamedeer--------	B	None	—	—	>6.0	—	—	—	—
Ringling--------	A	None	—	—	>6.0	—	—	—	—
246F:									
Lamedeer--------	B	None	—	—	>6.0	—	—	—	—
Ringling--------	A	None	—	—	>6.0	—	—	—	—
250E:									
Macmeal---------	B	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
251C:									
Savage----------	C	None	—	—	>6.0	—	—	—	—
252D:									
Hilger----------	B	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
252E:									
Hilger----------	B	None	—	—	>6.0	—	—	—	—
254C:									
Fergus----------	B	None	—	—	>6.0	—	—	—	—
255C:									
Shambo----------	B	None	—	—	>6.0	—	—	—	—
Korchea---------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
255C:(cont.)									
Barvon----------	B	None	—	—	>6.0	—	—	—	—
255D:									
Barvon----------	B	None	—	—	>6.0	—	—	—	—
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Shambo----------	B	None	—	—	>6.0	—	—	—	—
256C:									
Yamacall--------	B	None	—	—	>6.0	—	—	—	—
Havre-----------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
260F:									
Kuro------------	D	None	—	—	>6.0	—	—	—	—
Wayden----------	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
261F:									
Wayden----------	D	None	—	—	>6.0	—	—	—	—
Castner---------	D	None	—	—	>6.0	—	—	—	—
262E:									
Wayden----------	D	None	—	—	>6.0	—	—	—	—
Windham---------	B	None	—	—	>6.0	—	—	—	—
280D:									
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
280E:									
Castner---------	D	None	—	—	>6.0	—	—	—	—
Kuro------------	D	None	—	—	>6.0	—	—	—	—
281D:									
Doney-----------	C	None	—	—	>6.0	—	—	—	—
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Macar-----------	B	None	—	—	>6.0	—	—	—	—
281E:									
Castner---------	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
282D:									
Castner---------	D	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
283D:									
Barvon----------	B	None	—	—	>6.0	—	—	—	—
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
283F:									
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
284D:									
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Barvon----------	B	None	—	—	>6.0	—	—	—	—
284F:									
Doney-----------	C	None	—	—	>6.0	—	—	—	—
Wayden----------	D	None	—	—	>6.0	—	—	—	—
285D:									
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Doney-----------	C	None	—	—	>6.0	—	—	—	—
285F:									
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Doney-----------	C	None	—	—	>6.0	—	—	—	—
286F:									
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Rock outcrop.									
287D:									
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
287F:									
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
288D:									
Delpoint--------	C	None	—	—	>6.0	—	—	—	—
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Havre-----------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
288F:									
Cabbart---------	D	None	—	—	>6.0	—	—	—	—
Delpoint--------	C	None	—	—	>6.0	—	—	—	—

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
289D:									
Barvon----------	B	None	—	—	>6.0	—	—	—	—
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Korchea---------	B	Rare	—	—	>6.0	—	—	—	—
289F:									
Cabba-----------	D	None	—	—	>6.0	—	—	—	—
Barvon----------	B	None	—	—	>6.0	—	—	—	—
291C:									
Windham---------	B	None	—	—	>6.0	—	—	—	—
292A:									
Straw-----------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
Korchea---------	B	Rare	Brief	Jan-Jul	>6.0	—	—	—	—
294C:									
Shambo----------	B	None	—	—	>6.0	—	—	—	—
295F:									
Bitton----------	B	None	—	—	>6.0	—	—	—	—
Winifred--------	C	None	—	—	>6.0	—	—	—	—
Castner---------	D	None	—	—	>6.0	—	—	—	—
296D:									
Borky-----------	C	None	—	—	>6.0	—	—	—	—
Sinnigam--------	D	None	—	—	>6.0	—	—	—	—

Soil Features

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
1E:					
Badland.					
2E:					
Rock outcrop.					
3A:					
Riverwash.					
5A:					
Harlake	>60	—	Low	High	Low
6A:					
Harlake	>60	—	Low	High	Low
7A:					
Lostriver	>60	—	Low	High	Moderate
7B:					
Lostriver	>60	—	Low	High	Moderate
Bullhook	>60	—	Moderate	High	Moderate
8A:					
Harlake	>60	—	Low	High	Low
Havre	>60	—	Moderate	High	Low
8B:					
Harlake	>60	—	Low	High	Low
Havre	>60	—	Moderate	High	Low
9A:					
Havre	>60	—	Moderate	High	Low
9B:					
Havre	>60	—	Moderate	High	Low
Yamacall	>60	—	Moderate	High	Low
10A:					
Havre	>60	—	Moderate	High	Low
11A:					
Havre	>60	—	Moderate	High	Low
Glendive	>60	—	Moderate	High	Low
11B:					
Havre	>60	—	Moderate	High	Low
Glendive	>60	—	Moderate	High	Low
12A:					
Havre	>60	—	Moderate	High	Low
Harlake	>60	—	Low	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
13A:					
Havre	>60	—	Moderate	High	Low
14A:					
Havre	>60	—	Moderate	High	Low
Glendive	>60	—	Moderate	High	Low
14B:					
Havre	>60	—	Moderate	High	Low
Glendive	>60	—	Moderate	High	Low
15A:					
Havre	>60	—	Moderate	High	Low
Harlake	>60	—	Low	High	Low
16A:					
Havre	>60	—	Moderate	High	Low
Yamacall	>60	—	Moderate	High	Low
17A:					
Harlake	>60	—	Low	High	Low
Havre	>60	—	Moderate	High	Low
20B:					
Harlake	>60	—	Low	High	Low
Marvan	>60	—	Low	High	Moderate
Vanda	>60	—	Low	High	Moderate
21A:					
McKenzie	>60	—	Low	High	Low
22B:					
Nobe	>60	—	Low	High	High
Absher	>60	—	Low	High	Moderate
23A:					
Gerdrum	>60	—	Low	High	Moderate
Vanda	>60	—	Low	High	Moderate
23B:					
Gerdrum	>60	—	Low	High	Moderate
Vanda	>60	—	Low	High	Moderate
Creed	>60	—	Low	High	Moderate
23C:					
Gerdrum	>60	—	Low	High	Moderate
Creed	>60	—	Low	High	Moderate

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
25A:					
Vanda	>60	—	Low	High	Moderate
26A:					
Weingart	20-40	Soft	Low	High	Moderate
26B:					
Weingart	20-40	Soft	Low	High	Moderate
Warhorse	10-20	Soft	Low	High	Low
30C:					
Busby	>60	—	Moderate	High	Low
30D:					
Busby	>60	—	Moderate	High	Low
31B:					
Delpoint	20-40	Soft	Moderate	High	Low
31C:					
Delpoint	20-40	Soft	Moderate	High	Low
Cabbart	10-20	Soft	Moderate	High	Low
Yamacall	>60	—	Moderate	High	Low
32B:					
Twilight	20-40	Soft	Moderate	High	Low
32D:					
Twilight	20-40	Soft	Moderate	High	Low
Blacksheep	10-20	Soft	Moderate	High	Low
Rock outcrop.					
33A:					
Yamacall	>60	—	Moderate	High	Low
33B:					
Yamacall	>60	—	Moderate	High	Low
34A:					
Yamacall	>60	—	Moderate	High	Low
34B:					
Yamacall	>60	—	Moderate	High	Low
35B:					
Yamacall	>60	—	Moderate	High	Low
Busby	>60	—	Moderate	High	Low
36B:					
Yamacall	>60	—	Moderate	High	Low
Delpoint	20-40	Soft	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
37A:					
Yamacall	>60	—	Moderate	High	Low
37B:					
Yamacall	>60	—	Moderate	High	Low
38A:					
Kobase	>60	—	Low	High	Low
Zatoville	>60	Soft	Low	High	Moderate
38B:					
Zatoville	>60	Soft	Low	High	Moderate
39B:					
Delpoint	20-40	Soft	Moderate	High	Low
39C:					
Delpoint	20-40	Soft	Moderate	High	Low
Cabbart	10-20	Soft	Moderate	High	Low
Yamacall	>60	—	Moderate	High	Low
40B:					
Kobase	>60	—	Low	High	Low
40C:					
Kobase	>60	—	Low	High	Low
41A:					
Yamacall	>60	—	Moderate	High	Low
41B:					
Yamacall	>60	—	Moderate	High	Low
41C:					
Yamacall	>60	—	Moderate	High	Low
Delpoint	20-40	Soft	Moderate	High	Low
50B:					
Hinterland	10-20	Hard	Low	Moderate	Low
50C:					
Hinterland	10-20	Hard	Low	Moderate	Low
50D:					
Hinterland	10-20	Hard	Low	Moderate	Low
Delplain	10-20	Hard	Low	Moderate	Low
51A:					
Ethridge	>60	—	Low	High	Low
51B:					
Ethridge	>60	—	Low	High	Low
52A:					
Eapa	>60	—	Moderate	Moderate	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
52B:					
Eapa	>60	—	Moderate	Moderate	Low
53A:					
Tanna	20-40	Soft	Low	High	Low
54A:					
Marmarth	20-40	Soft	Moderate	High	Low
56A:					
Crago	>60	—	Moderate	High	Low
Musselshell	>60	—	Moderate	High	Low
Attewan	>60	—	Moderate	High	Low
57A:					
Attewan	>60	—	Moderate	High	Low
57B:					
Attewan	>60	—	Moderate	High	Low
57C:					
Attewan	>60	—	Moderate	High	Low
Niart	>60	—	Moderate	High	Low
58A:					
Verson	>60	—	Low	High	Low
60B:					
Abor	20-40	Soft	Low	High	Low
60C:					
Abor	20-40	Soft	Low	High	Low
Neldore	10-20	Soft	Low	High	Moderate
60D:					
Neldore	10-20	Soft	Low	High	Moderate
Abor	20-40	Soft	Low	High	Low
60E:					
Neldore	10-20	Soft	Low	High	Moderate
Abor	20-40	Soft	Low	High	Low
61D:					
Neldore	10-20	Soft	Low	High	Moderate
Neldore, saline	10-20	Soft	Low	High	Moderate
61E:					
Neldore	10-20	Soft	Low	High	Moderate
Volborg	10-20	Soft	Low	High	High
62C:					
Neldore	10-20	Soft	Low	High	Moderate

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
62D:					
Neldore	10-20	Soft	Low	High	Moderate
Yawdim	10-20	Soft	Low	High	Low
62E:					
Neldore	10-20	Soft	Low	High	Moderate
Rock outcrop.					
63A:					
Marias	>60	—	Low	High	Low
64A:					
Marvan	>60	—	Low	High	Moderate
Vanda	>60	—	Low	High	Moderate
64B:					
Marvan	>60	—	Low	High	Moderate
67D:					
Yawdim	10-20	Soft	Low	High	Low
68C:					
Megonot	20-40	Soft	Low	High	Low
Yawdim	10-20	Soft	Low	High	Low
69C:					
Orinoco	20-40	Soft	Low	High	High
Yawdim	10-20	Soft	Low	High	Low
73D:					
Yawdim	10-20	Soft	Low	High	Low
Abor	20-40	Soft	Low	High	Low
73E:					
Yawdim	10-20	Soft	Low	High	Low
Abor	20-40	Soft	Low	High	Low
74D:					
Abor	20-40	Soft	Low	High	Low
Crago	>60	—	Moderate	High	Low
74E:					
Abor	20-40	Soft	Low	High	Low
Crago	>60	—	Moderate	High	Low
80E:					
Blacksheep	10-20	Soft	Moderate	High	Low
Rock outcrop.					
Twilight	20-40	Soft	Low	Moderate	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
81B:					
Delpoint--------	20-40	Soft	Moderate	High	Low
Cabbart---------	10-20	Soft	Moderate	High	Low
81C:					
Delpoint--------	20-40	Soft	Moderate	High	Low
Cabbart---------	10-20	Soft	Moderate	High	Low
81D:					
Cabbart---------	10-20	Soft	Moderate	High	Low
82B:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
82C:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
Rock outcrop.					
82E.					
Cabbart---------	10-20	Soft	Moderate	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
Rock outcrop.					
83D:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Rock outcrop.					
Blacksheep------	10-20	Soft	Moderate	High	Low
84C:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Yawdim----------	10-20	Soft	Low	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
84D:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Yawdim----------	10-20	Soft	Low	High	Low
Rock outcrop.					
84E:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Yawdim----------	10-20	Soft	Low	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
85A:					
Cabbart---------	10-20	Soft	Moderate	High	Low
86D:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Rentsac---------	10-20	Hard	Moderate	High	Low
86E:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Rock outcrop.					
87B:					
Delpoint--------	20-40	Soft	Moderate	High	Low
Cabbart---------	10-20	Soft	Moderate	High	Low
88D:					
Delpoint--------	20-40	Soft	Moderate	High	Low
Cabbart---------	10-20	Soft	Moderate	High	Low
Rock outcrop.					
89C:					
Rentsac---------	10-20	Hard	Moderate	High	Low
90B:					
Chinook---------	>60	—	Moderate	High	Low
91A:					
Kremlin---------	>60	—	Moderate	High	Low
91B:					
Kremlin---------	>60	—	Moderate	High	Low
92A:					
Binna-----------	>60	—	Moderate	High	Low
93A:					
Crago-----------	>60	—	Moderate	High	Low
Musselshell-----	>60	—	Moderate	High	Low
93B:					
Crago-----------	>60	—	Moderate	High	Low
94A:					
Crago-----------	>60	—	Moderate	High	Low
94E:					
Crago-----------	>60	—	Moderate	High	Low
95A:					
Crago-----------	>60	—	Moderate	High	Low
Musselshell-----	>60	—	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
95B:					
Crago-----------	>60	—	Moderate	High	Low
Attewan---------	>60	—	Moderate	High	Low
Musselshell-----	>60	—	Moderate	High	Low
95C:					
Crago-----------	>60	—	Moderate	High	Low
Attewan---------	>60	—	Moderate	High	Low
95E:					
Yawdim----------	10-20	Soft	Low	High	Low
Crago-----------	>60	—	Moderate	High	Low
96E:					
Crago-----------	>60	—	Moderate	High	Low
Abor------------	20-40	Soft	Low	High	Low
97A:					
Musselshell-----	>60	—	Moderate	High	Low
Crago-----------	>60	—	Moderate	High	Low
97B:					
Musselshell-----	>60	—	Moderate	High	Low
Crago-----------	>60	—	Moderate	High	Low
98A:					
Niart-----------	>60	—	Moderate	High	Low
98B:					
Niart-----------	>60	—	Moderate	High	Low
Crago-----------	>60	—	Moderate	High	Low
98C:					
Niart-----------	>60	—	Moderate	High	Low
Crago-----------	>60	—	Moderate	High	Low
98D:					
Niart-----------	>60	—	Moderate	High	Low
Rothiemay-------	>60	—	Moderate	High	Low
123C:					
Creed-----------	>60	—	Low	High	Moderate
Gerdrum---------	>60	—	Low	High	Moderate
130B:					
Busby-----------	>60	--	Moderate	High	Low
Twilight--------	20-40	Soft	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
131C:					
Delpoint	20-40	Soft	Moderate	High	Low
Yamacall	>60	—	Moderate	High	Low
132B:					
Twilight	20-40	Soft	Moderate	High	Low
Blacksheep	10-20	Soft	Moderate	High	Low
138B:					
Zatoville	>60	Soft	Low	High	Moderate
Orinoco	20-40	Soft	Low	High	High
140B:					
Kobase	>60	—	Low	High	Low
Megonot	20-40	Soft	Low	High	Low
140C:					
Kobase	>60	—	Low	High	Low
Megonot	20-40	Soft	Low	High	Low
142A:					
Rothiemay	>60	—	Moderate	High	Low
142B:					
Rothiemay	>60	—	Moderate	High	Low
142C:					
Rothiemay	>60	—	Moderate	High	Low
Crago	>60	—	Moderate	High	Low
152A:					
Eapa	>60	—	Moderate	Moderate	Low
Attewan	>60	—	Moderate	High	Low
153C:					
Tanna	20-40	Soft	Low	High	Low
Cabbart	10-20	Soft	Moderate	High	Low
153D:					
Cabbart	10-20	Soft	Moderate	High	Low
Tanna	20-40	Soft	Low	High	Low
154C:					
Marmarth	20-40	Soft	Moderate	High	Low
Cabbart	10-20	Soft	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
154D:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Marmarth--------	20-40	Soft	Moderate	High	Low
158A:					
Ethridge--------	>60	—	Low	High	Low
Verson----------	>60	—	Low	High	Low
167D:					
Yawdim----------	10-20	Soft	Low	High	Low
Orinoco---------	20-40	Soft	Low	High	High
167E:					
Yawdim----------	10-20	Soft	Low	High	Low
Orinoco---------	20-40	Soft	Low	High	High
181D:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Crago-----------	>60	—	Moderate	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
181E:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Crago-----------	>60	—	Moderate	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
189C:					
Rentsac---------	10-20	Hard	Moderate	High	Low
Cabbart---------	10-20	Soft	Moderate	High	Low
189E:					
Rentsac---------	10-20	Hard	Moderate	High	Low
Rock outcrop.					
230C:					
Macar-----------	>60	—	Moderate	High	Low
232E:					
Hughesville-----	20-40	Hard	Moderate	High	Low
Tibs------------	>60	—	Moderate	High	Low
Whitecow--------	>60	—	Moderate	High	Low
234F:					
Tibs------------	>60	—	Moderate	High	Low
Whitecow--------	>60	—	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
240E:					
Ridge-----------	10-20	Soft	Moderate	High	Low
Dast------------	20-40	Soft	Moderate	High	Low
Rock outcrop.					
241E:					
Twilight--------	20-40	Soft	Moderate	High	Low
Blacksheep------	10-20	Soft	Moderate	High	Low
Rock outcrop.					
242D:					
Dast------------	20-40	Soft	Moderate	High	Low
Ridge-----------	10-20	Soft	Moderate	High	Low
242F:					
Ridge-----------	10-20	Soft	Moderate	High	Low
Dast------------	20-40	Soft	Moderate	High	Low
243F:					
Blacksheep------	10-20	Soft	Moderate	High	Low
Twilight--------	20-40	Soft	Moderate	High	Low
245C:					
Lamedeer--------	>60	—	Moderate	High	Low
Ringling--------	>60	—	Low	Moderate	Low
245F:					
Lamedeer--------	>60	—	Moderate	High	Low
Ringling--------	>60	—	Low	Moderate	Low
246F:					
Lamedeer--------	>60	—	Moderate	High	Low
Ringling--------	>60	—	Low	Moderate	Low
250E:					
Macmeal---------	>60	—	Moderate	High	Low
Rock outcrop.					
251C:					
Savage----------	>60	—	Low	High	Low
252D:					
Hilger----------	>60	—	Moderate	High	Low
Rock outcrop.					
252E:					
Hilger----------	>60	—	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
254C:					
Fergus----------	>60	—	Low	High	Low
255C:					
Shambo----------	>60	—	Moderate	High	Low
Korchea---------	>60	—	Moderate	High	Low
Barvon----------	20-40	Soft	Moderate	High	Low
255D:					
Barvon----------	20-40	Soft	Moderate	High	Low
Cabba-----------	10-20	Soft	Moderate	High	Low
Shambo----------	>60	—	Moderate	High	Low
256C:					
Yamacall--------	>60	—	Moderate	High	Low
Havre-----------	>60	—	Moderate	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
260F:					
Kuro------------	10-20	Soft	Moderate	High	Low
Wayden----------	10-20	Soft	Low	High	Moderate
Rock outcrop.					
261F:					
Wayden----------	10-20	Soft	Low	High	Moderate
Castner---------	10-20	Hard	Moderate	High	Low
262E:					
Wayden----------	10-20	Soft	Low	High	Moderate
Windham---------	>60	—	Moderate	High	Low
280D:					
Cabbart---------	10-20	Soft	Moderate	High	Low
Delpoint--------	20-40	Soft	Moderate	High	Low
280E:					
Castner---------	10-20	Hard	Moderate	High	Low
Kuro------------	10-20	Soft	Moderate	High	Low
281D:					
Doney-----------	20-40	Soft	Moderate	High	Low
Cabba-----------	10-20	Soft	Moderate	High	Low
Macar-----------	>60	—	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
281E:					
Castner	10-20	Hard	Moderate	High	Low
Rock outcrop.					
282D:					
Castner	10-20	Hard	Moderate	High	Low
283D:					
Barvon	20-40	Soft	Moderate	High	Low
Cabba	10-20	Soft	Moderate	High	Low
283F:					
Cabba	10-20	Soft	Moderate	High	Low
Rock outcrop.					
284D:					
Cabba	10-20	Soft	Moderate	High	Low
Barvon	20-40	Soft	Moderate	High	Low
284F:					
Doney	20-40	Soft	Moderate	High	Low
Wayden	10-20	Soft	Low	High	Moderate
285D:					
Cabba	10-20	Soft	Moderate	High	Low
Doney	20-40	Soft	Moderate	High	Low
285F:					
Cabba	10-20	Soft	Moderate	High	Low
Doney	20-40	Soft	Moderate	High	Low
286F:					
Cabbart	10-20	Soft	Moderate	High	Low
Rock outcrop.					
287D:					
Delpoint	20-40	Soft	Moderate	High	Low
Cabbart	10-20	Soft	Moderate	High	Low
287F:					
Cabbart	10-20	Soft	Moderate	High	Low
Delpoint	20-40	Soft	Moderate	High	Low
288D:					
Delpoint	20-40	Soft	Moderate	High	Low
Cabbart	10-20	Soft	Moderate	High	Low
Havre	>60	—	Moderate	High	Low

Soil Features--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
288F:					
Cabbart----------	10-20	Soft	Moderate	High	Low
Delpoint---------	20-40	Soft	Moderate	High	Low
289D:					
Barvon-----------	20-40	Soft	Moderate	High	Low
Cabba------------	10-20	Soft	Moderate	High	Low
Korchea----------	>60	—	Moderate	High	Low
289F:					
Cabba------------	10-20	Soft	Moderate	High	Low
Barvon-----------	20-40	Soft	Moderate	High	Low
291C:					
Windham----------	>60	—	Moderate	High	Low
292A:					
Straw------------	>60	—	Moderate	High	Low
Korchea----------	>60	—	Moderate	High	Low
294C:					
Shambo-----------	>60	—	Moderate	High	Low
295F:					
Bitton-----------	>60	—	Moderate	High	Low
Winifred---------	20-40	Soft	Low	High	Low
Castner----------	10-20	Hard	Moderate	High	Low
296D:					
Borky------------	20-40	Soft	Low	High	Low
Sinnigam---------	10-20	Hard	Moderate	Moderate	Low

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and areal extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillite. Weakly metamorphosed mudstone or shale.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3.75
Low	3.75 to 5.0
Moderate	5.0 to 7.5
High	more than 7.5

Avalanche chute. The track or path formed by an avalanche.

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hill slopes. Back slopes in profile are commonly steep and linear and descend to a foot slope. In terms of gradational process, back slopes are erosional forms produced mainly by mass wasting and running water.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Board foot. A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep or very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition from woody vegetation and thus to allow understory grasses and forbs to recover or to make conditions favorable for reseeding. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, a felled tree generally is reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channeled. Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Cirque. A semicircular, concave, bowllike area that has steep faces primarily resulting from erosive activity of a mountain glacier.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clayey soil. Silty clay, sandy clay, or clay.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Clearcut. A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from the adjacent stands.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent cobbles, and extremely cobbly soil material is more than 60 percent cobbles.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. Any tillage and planting system in which a cover of crop residue is maintained on at least 30 percent of the soil surface after planting in order to reduce the hazard of water erosion; in areas where soil blowing is the primary concern, a system that maintains a cover of at least 1,000 pounds of flat residue of small grain or the equivalent during the critical erosion period.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Culmination of mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called culmination of mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit the use of a full stripcropping pattern.

Dominant Trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Esker. A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier and that were left behind when the ice melted. Eskers range from less than a mile to more than 100 miles in length and from 10 to 100 feet in height.

Even aged. Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sodium (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An area cleared of flammable material to stop or help control creeping or running fires. A firebreak also serves as a line from which to work and to facilitate the movement of fire fighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothills. A region of relatively low, rounded hills at the base of a mountain range.

Footslope. The geomorphic component that forms the inner, gently inclined surface at the base of a hill slope. The surface profile is dominantly concave. In terms of gradational processes, a foot slope is a transition zone between an upslope site of erosion (back slope) and a downslope site of deposition (toe slope).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Giant ripple mark. The undulating surface sculpture produced in noncoherent granular materials by currents of water and by the agitation of water in wave action during the draining of large glacial lakes, such as Glacial Lake Missoula.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Habitat type. An aggregation of all land areas capable of producing similar climax plant communities.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon.—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and are less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. A moundlike hill of glacial drift, composed chiefly of stratified sand and gravel.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lateral moraine. A ridgelike moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from the valley walls by glacial abrasion and plucking or by mass wasting.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

Low-residue crops. Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mean annual increment (MAI). The average annual increase in volume of a tree during the entire life of the tree.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Merchantable trees. Trees that are of sufficient size to be economically processed into wood products.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Microhigh. An area that is 2 to 12 inches higher than the adjacent microlow.

Microlow. An area that is 2 to 12 inches lower than the adjacent microhigh.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Miscellaneous water. A sewage lagoon, an industrial waste pit, a fish hatchery, or a similar water area.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moraine. An accumulation of glacial drift in a topographic landform of its own, resulting chiefly from the direct action of glacial ice. Some types are lateral, recessional, and terminal.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes greater than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. An extensive area of glaciofluvial material that was deposited by meltwater streams.

Overstory. The trees in a forest that form the upper crown cover.

Oxbow. The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch

Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Quartzite, metamorphic. Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

Quartzite, sedimentary. Very hard but unmetamorphosed sandstone consisting chiefly of quartz grains.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3

Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Recessional moraine. A moraine formed during a temporary but significant halt in the retreat of a glacier.

Red beds. Sedimentary strata mainly red in color and composed largely of sandstone and shale.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. Areas that have more than 90 percent of the surface covered by stones or boulders. Voids contain no soil material and virtually no vegetation other than lichens. The areas commonly are at the base of mountain slopes, but some are on mountain slopes as deposits of cobbles, stones, and boulders left by Pleistocene glaciation or by periglacial phenomena.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salinity. The electrical conductivity of a saline soil. It is expressed, in millimhos per centimeter, as follows:

Nonsaline	0 to 4
Slightly saline	4 to 8
Moderately saline	8 to 16
Strongly saline	more than 16

Salty water (in tables). Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy soil. Sand or loamy sand.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Scribner's log rule. A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

Sedimentary plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand;

shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Sedimentary uplands. Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder slope. The uppermost inclined surface at the top of a hillside. It is the transition zone from the back slope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant or dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slickens. Accumulations of fine textured material, such as material separated in placer-mine and ore-mill operations. Slickens from ore mills commonly consist of freshly ground rock that has undergone chemical treatment during the milling process.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is loamy or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level	0 to 2 percent
Gently sloping	2 to 4 percent
Moderately sloping	4 to 8 percent
Strongly sloping	8 to 15 percent
Moderately steep	15 to 25 percent
Steep	25 to 45 percent
Very steep	more than 45 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are: *platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter or loosen a layer that is restrictive to roots.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Tailwater. The water directly downstream of a structure.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances. It commonly is a massive arcuate ridge or complex of ridges underlain by till and other types of drift.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Till plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by or consists of till and that has a slope of 0 to 8 percent.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill. Toe slopes are commonly gentle and linear in profile.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Trafficability. The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Understory. Any plants in a forest community that grow to a height of less than 5 feet.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley. An elongated depressional area primarily developed by stream action.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The action of uprooting and tipping over trees by the wind.

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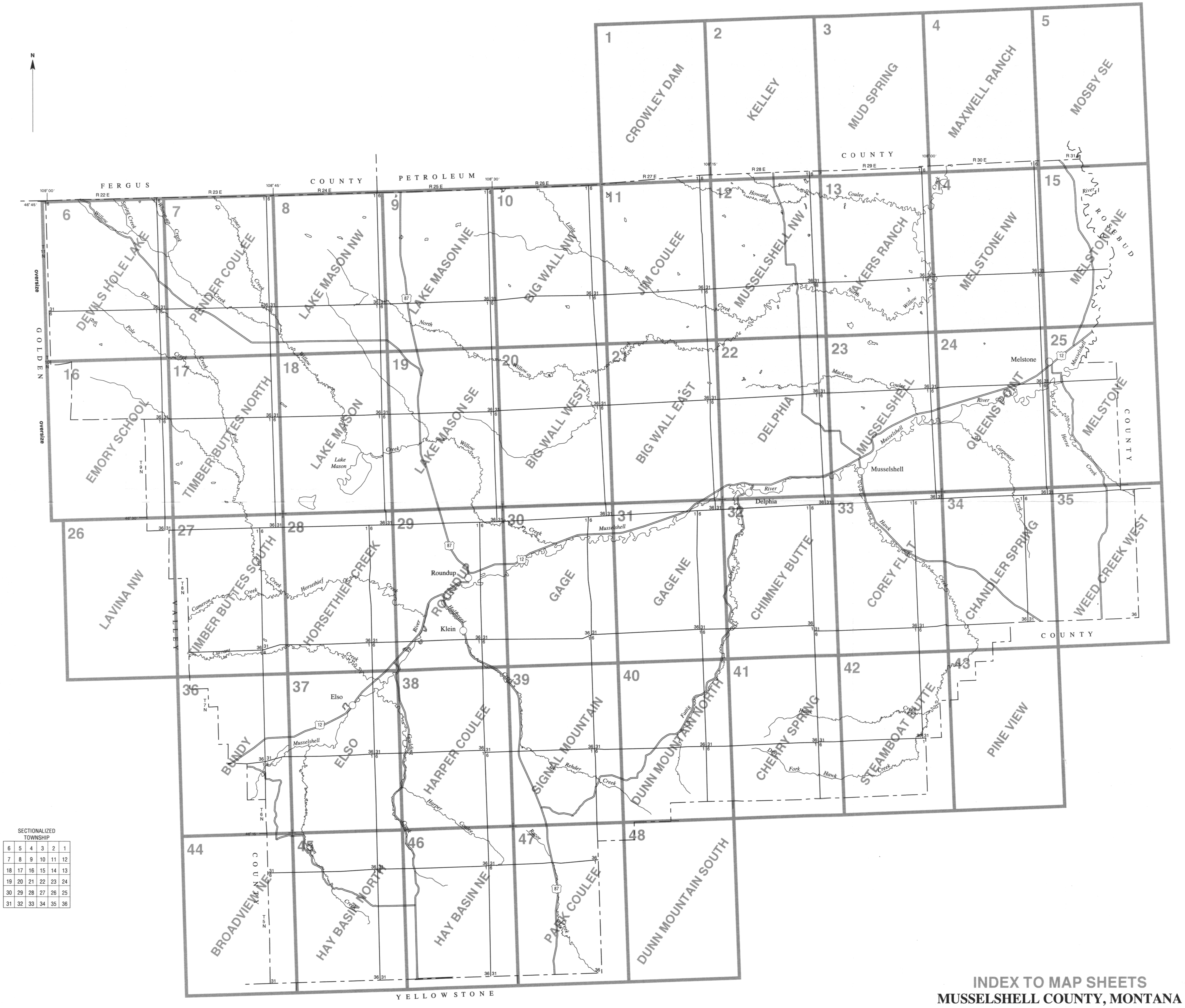
If you are deaf, are hard of hearing, or have speech disabilities and you wish to file either an EEO or program complaint, please contact USDA through the Federal Relay Service at (800) 877-8339 or (800) 845-6136 (in Spanish).

If you have other disabilities and wish to file a program complaint, please see the contact information above. If you require alternative means of communication for program information (e.g., Braille, large print, audiotape, etc.), please contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).


N
FERGUS COUNTY
PETROLEUM COUNTY
GOLDEN VALLEY COUNTY
ROSEBUD COUNTY
YELLOWSTONE COUNTY
oversize
oversize
1 CROWLEY DAM
2 KELLEY
3 MUD SPRING
4 MAXWELL RANCH
5 MOSBY SE
6 DEVILS HOLE LAKE
7 PENDER COULEE
8 LAKE MASON NW
9 LAKE MASON NE
10 BIG WALL NW
11 JIM COULEE
12 MUSSELSHELL NW
13 LAKERS RANCH
14 MELSTONE NW
15 MELSTONE NE
16 EMORY SCHOOL
17 TIMBER BUTTES NORTH
18 LAKE MASON
19 LAKE MASON SE
20 BIG WALL WEST
21 BIG WALL EAST
22 DELPHIA
23 MUSSELSHELL
24 QUEENS POINT
25 MELSTONE
26 LAVINA NW
27 TIMBER BUTTES SOUTH
28 HORSETHIEF CREEK
29 ROUNDUP
30 GAGE
31 GAGE NE
32 CHIMNEY BUTTE
33 COREY FLAT
34 CHANDLER SPRING
35 WEED CREEK WEST
36 BUNDY
37 ELSO
38 HARPER COULEE
39 SIGNAL MOUNTAIN
40 DUNN MOUNTAIN NORTH
41 CHERRY SPRING
42 STEAMBOAT BUTTE
43 PINE VIEW
44 BROADVIEW NE
45 HAY BASIN NORTH
46 HAY BASIN NE
47 PARK COULEE
48 DUNN MOUNTAIN SOUTH
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Roundup
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30 29 28 27 26 25
31 32 33 34 35 36

INDEX TO MAP SHEETS

MUSSELSHELL COUNTY, MONTANA

Scale 1:190080

1 0 1 2 3

MILES

1 0 1 2 3 4 5 6

KILOMETERS

SOIL LEGEND

The publication symbols consist of field symbols. Symbols consist of numbers or a combination of numbers and letters, for example, 9A, 60B, 284D, and 287F. For the symbols designated by a number and letter, the number designates the soil type and the letter designates the slope class. The symbols without a letter designate a miscellaneous area. Map units are arranged numerically by field symbols.

SYMBOL	NAME
1E	Badland
2E	Rock outcrop
3A	Riverwash
5A	Harlake silty clay, 0 to 2 percent slopes
6A	Harlake silty clay, 0 to 2 percent slopes, occasionally flooded
7A	Lostriver silty clay, 0 to 2 percent slopes
7B	Lostriver-Bullhook complex, 0 to 2 percent slopes
8A	Harlake-Havre complex, 0 to 2 percent slopes, occasionally flooded
8B	Harlake-Havre complex, 0 to 2 percent slopes
9A	Havre loam, 0 to 2 percent slopes
9B	Havre-Yamacall loams, 0 to 4 percent slopes
10A	Havre loam, 0 to 2 percent slopes, occasionally flooded
11A	Havre-Glendive complex, 0 to 2 percent slopes
11B	Havre-Glendive complex, 0 to 2 percent slopes, occasionally flooded
12A	Havre-Harlake complex, channeled, 0 to 2 percent slopes
13A	Havre loam, calcareous, 0 to 2 percent slopes
14A	Havre, calcareous-Glendive complex, 0 to 2 percent slopes
14B	Havre, calcareous-Glendive complex, 0 to 2 percent slopes, occasionally flooded
15A	Havre-Harlake complex, calcareous, 0 to 2 percent slopes
16A	Havre-Yamacall loams, calcareous, 0 to 4 percent slopes
17A	Harlake-Havre complex, calcareous, 0 to 2 percent slopes
20B	Harlake-Marvan-Vanda silty clays, 0 to 4 percent slopes
21A	McKenzie silty clay, 0 to 2 percent slopes
22B	Nobe-Absher complex, 0 to 4 percent slopes
23A	Gerdrum-Vanda complex, 0 to 8 percent slopes
23B	Gerdrum-Vanda-Creed complex, 0 to 8 percent slopes
23C	Gerdrum-Creed loams, 0 to 8 percent slopes
25A	Vanda silty clay, 0 to 4 percent slopes
26A	Weingart loam, 1 to 8 percent slopes
26B	Weingart-Warhorse loams, 1 to 8 percent slopes
30C	Busby fine sandy loam, 2 to 8 percent slopes
30D	Busby fine sandy loam, 8 to 15 percent slopes
31B	Delpoint loam, 2 to 8 percent slopes
31C	Delpoint-Cabbart-Yamacall loams, 4 to 15 percent slopes
32B	Twilight sandy loam, 2 to 8 percent slopes
32D	Twilight-Blacksheep-Rock outcrop complex, 4 to 25 percent slopes
33A	Yamacall loam, 0 to 2 percent slopes
33B	Yamacall loam, 2 to 8 percent slopes
34A	Yamacall clay loam, 0 to 2 percent slopes
34B	Yamacall clay loam, 2 to 8 percent slopes
35B	Yamacall-Busby complex, 2 to 8 percent slopes
36B	Yamacall-Delpoint loams, 2 to 8 percent slopes
37A	Yamacall clay loam, calcareous, 0 to 2 percent slopes
37B	Yamacall clay loam, calcareous, 2 to 8 percent slopes
38A	Kobase-Zatoville silty clay loams, 0 to 8 percent slopes
38B	Zatoville silty clay loam, 0 to 8 percent slopes
39B	Delpoint loam, calcareous, 2 to 8 percent slopes
39C	Delpoint, calcareous-Cabbart-Yamacall loams, 4 to 15 percent slopes
40B	Kobase silty clay loam, 0 to 8 percent slopes
40C	Kobase silty clay loam, calcareous, 0 to 8 percent slopes
41A	Yamacall loam, calcareous, 0 to 2 percent slopes
41B	Yamacall loam, calcareous, 2 to 8 percent slopes
41C	Yamacall-Delpoint loams, calcareous, 2 to 8 percent slopes
50B	Hinterland loam, 1 to 6 percent slopes
50C	Hinterland loam, 6 to 15 percent slopes
50D	Hinterland-Delplain complex, 8 to 25 percent slopes
51A	Ethridge clay loam, 0 to 2 percent slopes
51B	Ethridge clay loam, 2 to 8 percent slopes
52A	Eapa loam, 0 to 2 percent slopes
52B	Eapa loam, 2 to 8 percent slopes
53A	Tanna loam, 1 to 6 percent slopes
54A	Marmarth fine sandy loam, 0 to 8 percent slopes
56A	Crago-Musselshell-Attewan complex, 0 to 2 percent slopes
57A	Attewan loam, 0 to 4 percent slopes
57B	Attewan cobbly loam, 0 to 4 percent slopes
57C	Attewan-Niart loams, 0 to 4 percent slopes
58A	Verson clay loam, 0 to 4 percent slopes
60B	Abor silty clay, 1 to 8 percent slopes
60C	Abor-Neldore silty clays, 2 to 8 percent slopes
60D	Neldore-Abor silty clays, 4 to 15 percent slopes
60E	Neldore-Abor silty clays, 15 to 45 percent slopes
61D	Neldore-Neldore, saline silty clays, 4 to 25 percent slopes
61E	Neldore-Volborg silty clays, 4 to 25 percent slopes
62C	Neldore silty clay, 4 to 25 percent slopes
62D	Neldore-Yawdim silty clays, 4 to 25 percent slopes
62E	Neldore-Rock outcrop complex, 15 to 45 percent slopes
63A	Marias silty clay, 0 to 4 percent slopes
64A	Marvan-Vanda silty clays, 0 to 8 percent slopes
64B	Marvan silty clay, 0 to 8 percent slopes
67D	Yawdim silty clay loam, 4 to 25 percent slopes
68C	Megonot-Yawdim silty clay loams, 4 to 15 percent slopes
69C	Orinoco-Yawdim silty clay loams, 4 to 15 percent slopes
73D	Yawdim-Abor complex, 4 to 15 percent slopes
73E	Yawdim-Abor complex, 15 to 60 percent slopes
74D	Abor-Crago complex, 2 to 15 percent slopes
74E	Abor-Crago complex, 15 to 35 percent slopes
80E	Blacksheep-Rock outcrop-Twilight complex, 8 to 45 percent slopes
81B	Delpoint-Cabbart loams, 2 to 8 percent slopes
81C	Delpoint-Cabbart loams, 8 to 15 percent slopes
81D	Cabbart loam, 4 to 15 percent slopes
82B	Cabbart-Delpoint loams, 4 to 15 percent slopes
82C	Cabbart-Delpoint-Rock outcrop complex, 4 to 15 percent slopes
82E	Cabbart-Delpoint-Rock outcrop complex, 8 to 45 percent slopes
83D	Cabbart-Rock outcrop-Blacksheep complex, 8 to 45 percent slopes
84C	Cabbart-Yawdim-Delpoint complex, 4 to 15 percent slopes
84D	Cabbart-Yawdim-Rock outcrop complex, 4 to 35 percent slopes
84E	Cabbart-Yawdim-Delpoint complex, 15 to 35 percent slopes
85A	Cabbart clay loam, 0 to 2 percent slopes
86D	Cabbart-Rentsac complex, 2 to 15 percent slopes
86E	Cabbart-Rock outcrop complex, 4 to 35 percent slopes
87B	Delpoint, calcareous-Cabbart loams, 2 to 8 percent slopes
88D	Delpoint-Cabbart-Rock outcrop complex, 4 to 35 percent slopes
89C	Rentsac fine sandy loam, 2 to 8 percent slopes
90B	Chinook fine sandy loam, 2 to 8 percent slopes
91A	Kremlin loam, 0 to 2 percent slopes
91B	Kremlin loam, 2 to 8 percent slopes
92A	Binna loam, 0 to 4 percent slopes
93A	Crago-Musselshell complex, 0 to 4 percent slopes
93B	Crago cobbly loam, 1 to 6 percent slopes
94A	Crago gravelly loam, 0 to 8 percent slopes
94E	Crago gravelly loam, 8 to 35 percent slopes
95A	Crago-Musselshell cobbly loams, 0 to 4 percent slopes
95B	Crago-Attewan-Musselshell cobbly loams, 0 to 4 percent slopes
95C	Crago-Attewan cobbly loams, 2 to 8 percent slopes
95E	Yawdim-Crago complex, 4 to 35 percent slopes
96E	Crago-Abor complex, 4 to 35 percent slopes
97A	Musselshell-Crago cobbly loams, 0 to 4 percent slopes
97B	Musselshell-Crago complex, 4 to 8 percent slopes
98A	Niart cobbly loam, 0 to 4 percent slopes
98B	Niart-Crago complex, 0 to 4 percent slopes
98C	Niart-Crago complex, 4 to 15 percent slopes
98D	Niart-Rothiemay loams, 0 to 4 percent slopes
123C	Creed-Gerdrum loams, 0 to 8 percent slopes
130B	Busby-Twilight complex, 2 to 8 percent slopes
131C	Delpoint-Yamacall loams, 2 to 8 percent slopes
132B	Twilight-Blacksheep sandy loams, 2 to 8 percent slopes
138B	Zatoville-Orinoco silty clay loams, 2 to 8 percent slopes
140B	Kobase-Megonot silty clay loams, 0 to 8 percent slopes
140C	Kobase-Megonot silty clay loams, calcareous, 0 to 8 percent slopes
142A	Rothiemay loam, calcareous, 0 to 2 percent slopes
142B	Rothiemay loam, calcareous, 2 to 8 percent slopes
142C	Rothiemay-Crago complex, 4 to 15 percent slopes
152A	Eapa-Attewan loams, 0 to 2 percent slopes
153C	Tanna-Cabbart loams, 2 to 8 percent slopes
153D	Cabbart-Tanna loams, 4 to 15 percent slopes
154C	Marmarth-Cabbart complex, 2 to 8 percent slopes
154D	Cabbart-Marmarth complex, 4 to 15 percent slopes
158A	Ethridge-Verson clay loams, 0 to 2 percent slopes
167D	Yawdim-Orinoco silty clay loams, 4 to 15 percent slopes
167E	Yawdim-Orinoco silty clay loams, 15 to 35 percent slopes
181D	Cabbart-Crago-Delpoint complex, 4 to 15 percent slopes
181E	Cabbart-Crago-Delpoint complex, 15 to 35 percent slopes
189C	Rentsac-Cabbart complex, 2 to 15 percent slopes
189E	Rentsac-Rock outcrop complex, 15 to 45 percent slopes
230C	Macar loam, 2 to 8 percent slopes
232E	Hughesville-Tibs-Whitecow complex, 2 to 25 percent slopes
234F	Tibs-Whitecow cobbly clay loams, 25 to 60 percent slopes
240E	Ridge-Dast-Rock outcrop complex, 4 to 35 percent slopes
241E	Twilight-Blacksheep-Rock outcrop complex, 4 to 35 percent slopes
242D	Dast-Ridge sandy loams, 2 to 8 percent slopes
242F	Ridge-Dast sandy loams, 8 to 45 percent slopes
243F	Blacksheep-Twilight sandy loams, 8 to 45 percent slopes
245C	Lamedeer-Ringling channery loams, 2 to 8 percent slopes
245F	Lamedeer-Ringling channery loams, 4 to 45 percent slopes
246F	Lamedeer-Ringling channery loams, moist, 4 to 45 percent slopes
250E	Macmeal-Rock outcrop complex, 4 to 35 percent slopes
251C	Savage loam, 2 to 8 percent slopes
252D	Hilger-Rock outcrop complex, 4 to 35 percent slopes
252E	Hilger stony loam, 4 to 25 percent slopes
254C	Fergus clay loam, 2 to 8 percent slopes
255C	Shambo-Korchea-Barvon loams, 2 to 8 percent slopes
255D	Barvon-Cabba-Shambo loams, 4 to 15 percent slopes
256C	Yamacall-Havre-Delpoint loams, 2 to 8 percent slopes
260F	Kuro-Wayden-Rock outcrop complex, 4 to 35 percent slopes
261F	Wayden-Castner complex, 8 to 45 percent slopes
262E	Wayden-Windham complex, 4 to 25 percent slopes
280D	Cabbart, moist-Delpoint, dry loams, 4 to 15 percent slopes
280E	Castner-Kuro complex, 4 to 25 percent slopes
281D	Doney-Cabba-Macar loams, 4 to 15 percent slopes
281E	Castner-Rock outcrop complex, 8 to 45 percent slopes
282D	Castner channery loam, 4 to 25 percent slopes
283D	Barvon-Cabba loams, 2 to 8 percent slopes
283F	Cabba-Rock outcrop complex, 8 to 45 percent slopes
284D	Cabba-Barvon loams, 4 to 15 percent slopes
284F	Doney-Wayden complex, 15 to 60 percent slopes
285D	Cabba-Doney loams, 4 to 15 percent slopes
285F	Cabba-Doney loams, 8 to 45 percent slopes
286F	Cabbart-Rock outcrop complex, 8 to 45 percent slopes
287D	Delpoint, dry-Cabbart, moist loams, 2 to 8 percent slopes
287F	Cabbart, moist-Delpoint, dry loams, 8 to 45 percent slopes
288D	Delpoint-Cabbart-Havre loams, 4 to 25 percent slopes
288F	Cabbart-Delpoint loams, 15 to 65 percent slopes
289D	Barvon-Cabba-Korchea loams, 3 to 25 percent slopes
289F	Cabba-Barvon loams, 15 to 65 percent slopes
291C	Windham very stony loam, 2 to 15 percent slopes
292A	Straw-Korchea loams, 0 to 2 percent slopes
294C	Shambo loam, 2 to 8 percent slopes
295F	Bitton-Winifred-Castner complex, 15 to 60 percent slopes
296D	Borky-Sinnigam very stony clay loams, 2 to 15 percent slopes
DA	Denied access
UL	Urban land
W	Water

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

County or parish	——— –
Reservation (national forest or park, state forest or park, and large airport)	—— · ——
Public Land Survey System Section Boundary	————

ROAD EMBLEM & DESIGNATIONS

Federal	287

PITS

Gravel pit	⚒

WATER FEATURES

MISCELLANEOUS WATER FEATURES

Marsh or swamp	⩛
Wet spot	Ψ

SPECIAL SYMBOLS FOR SOIL SURVEY

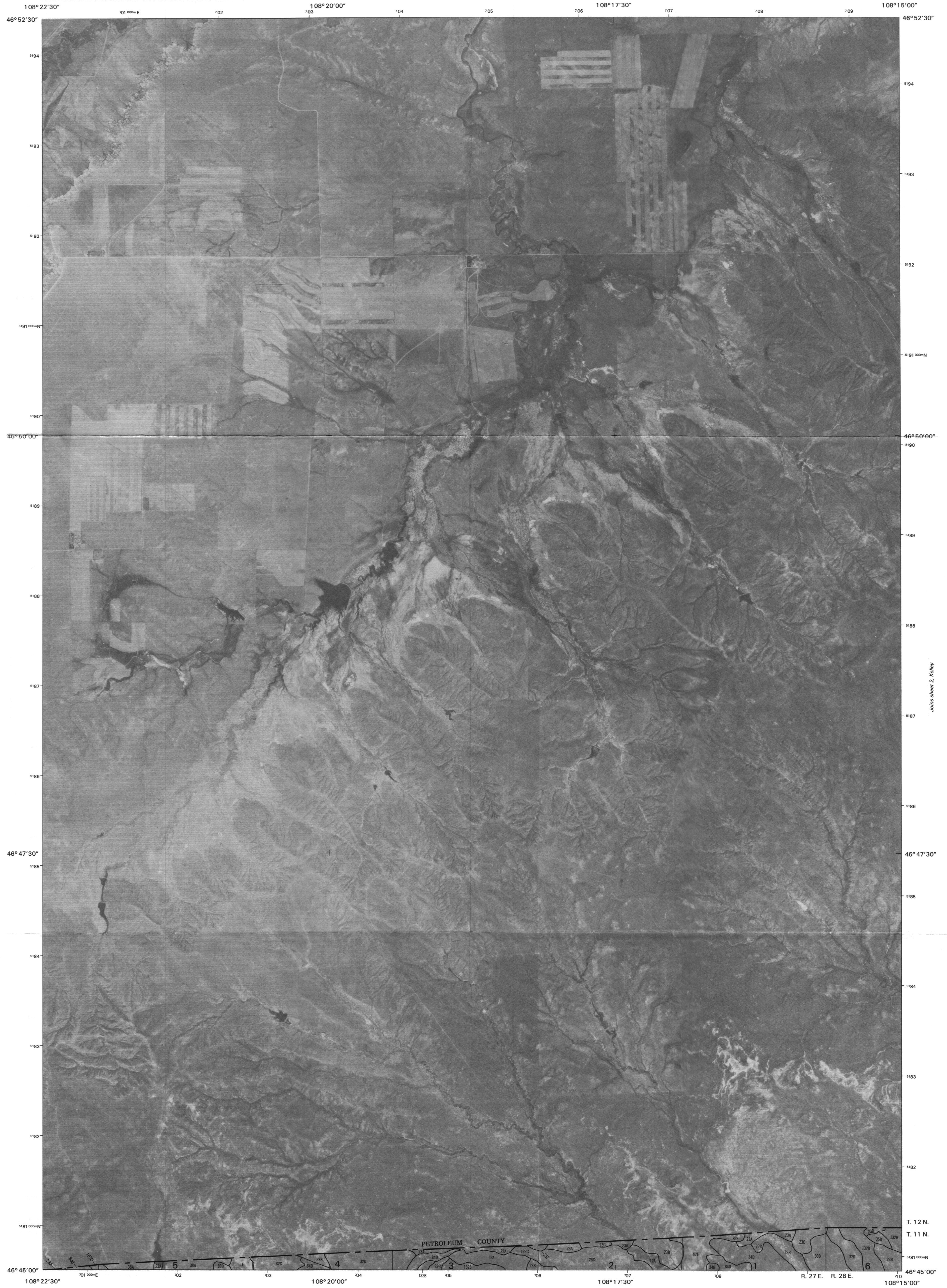
SOIL DELINEATIONS AND SYMBOLS	38A 83D
SHORT STEEP SLOPE	··········

MISCELLANEOUS

Clay spot	⋇
Gravelly spot	∴
Rock outcrop	∨
Saline spot	+
Sandy spot	⁙
Sodic spot	∅

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
CROWLEY DAM QUADRANGLE
SHEET NUMBER 1 OF 48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PETROLEUM COUNTY
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82E
23A
23B
23B
23A
23C
90B
34B
32D
132B
6
23B
35B
132B
23B

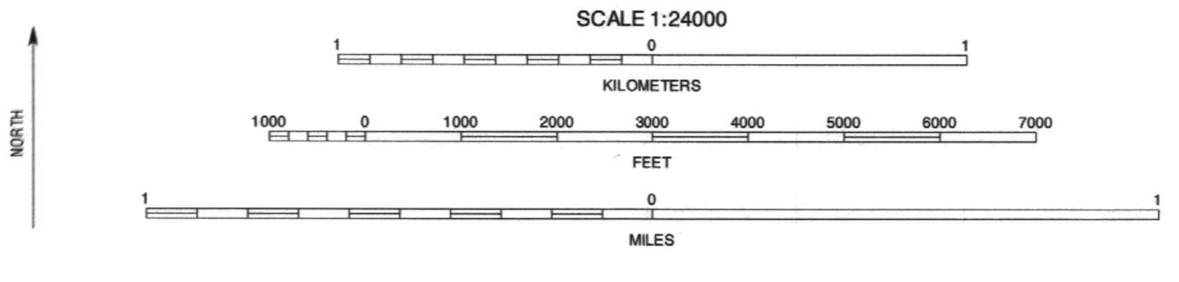
Joins sheet 11, Jim Coulee

Joins sheet 10, Big Wall NW

Joins sheet 12, Musselshell NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.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QUADRANGLE LOCATION

CROWLEY DAM, MONTANA

7.5 MINUTE SERIES
SHEET NUMBER 1 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
KELLEY QUADRANGLE
SHEET NUMBER 2 OF 48

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Joins sheet 1, Crowley Dam
Joins sheet 3, Mud Spring
T. 12 N.
T. 11 N.
PETROLEUM COUNTY
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36B
131C
23B
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62C
63A
38A
38A
6
5
4
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R. 28 E.
R. 29 E.
Joins sheet 12, Musselshell NW
Joins sheet 11, Jim Coulee
Joins sheet 13, Akers Ranch

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

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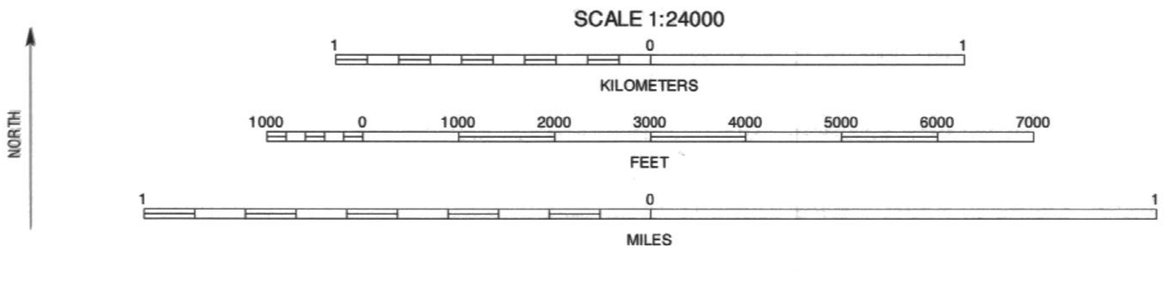
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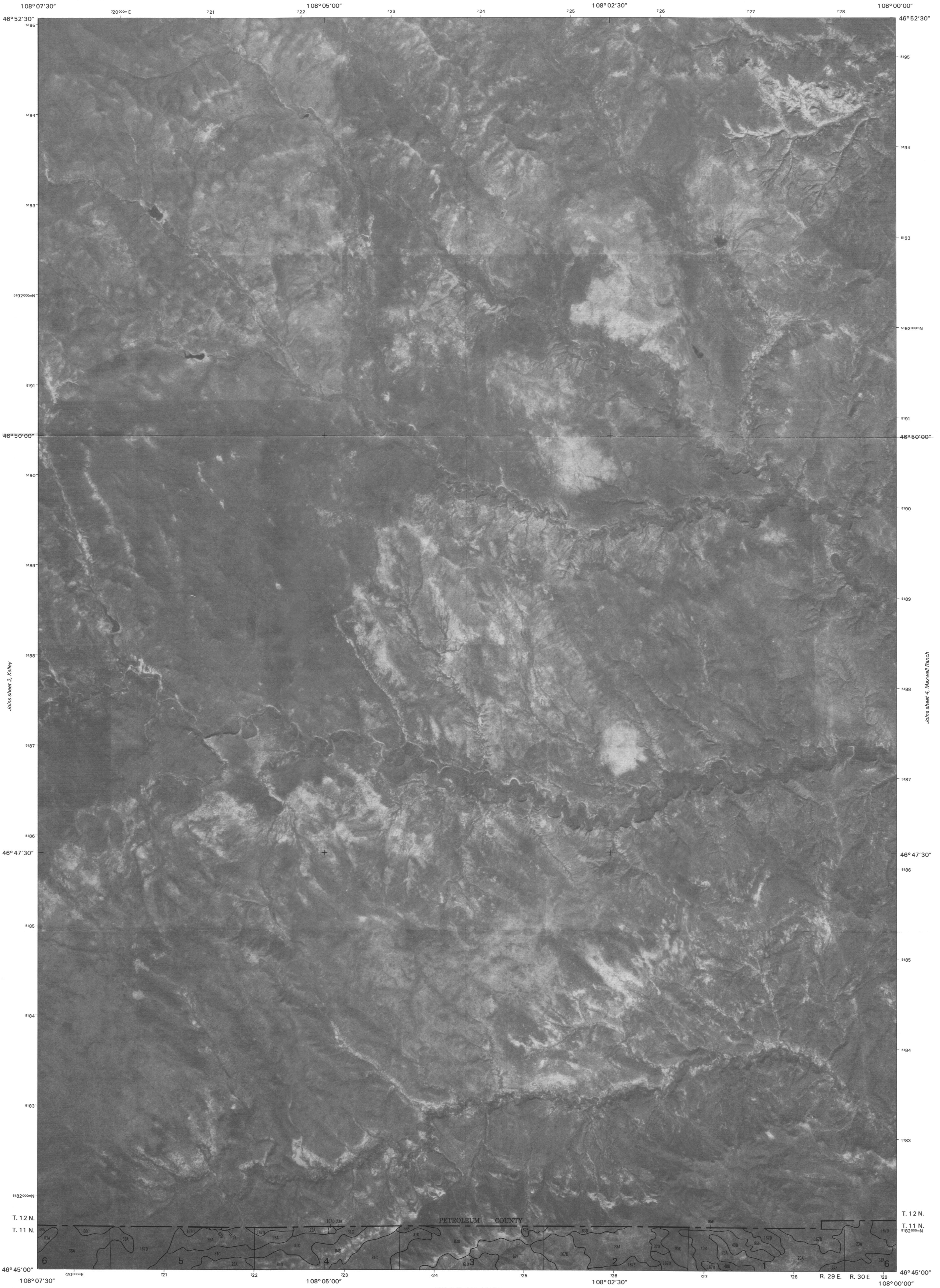
QUADRANGLE LOCATION

KELLEY, MONTANA

7.5 MINUTE SERIES
SHEET NUMBER 2 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MUD SPRING QUADRANGLE
SHEET NUMBER 3 OF 48



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R. 29 E.
R. 30 E
Joins sheet 2, Kelley
Joins sheet 4, Maxwell Ranch
Joins sheet 13, Akers Ranch
Joins sheet 12, Musselshell NW
Joins sheet 14, Melstone NW
PETROLEUM COUNTY
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60C
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61D
82E
62E
167E
32D
95E
40B

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

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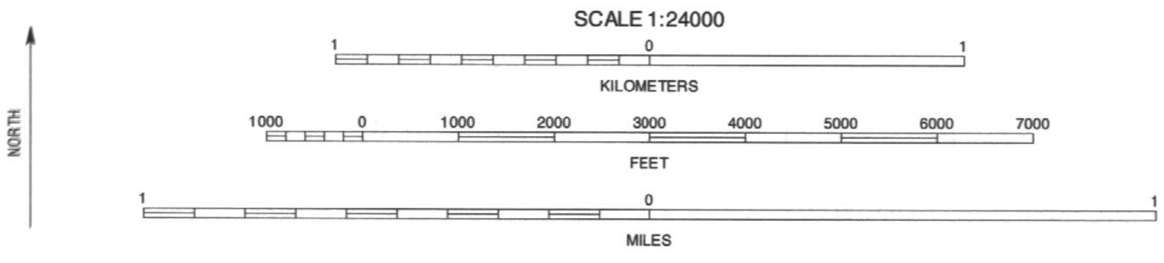

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FEET
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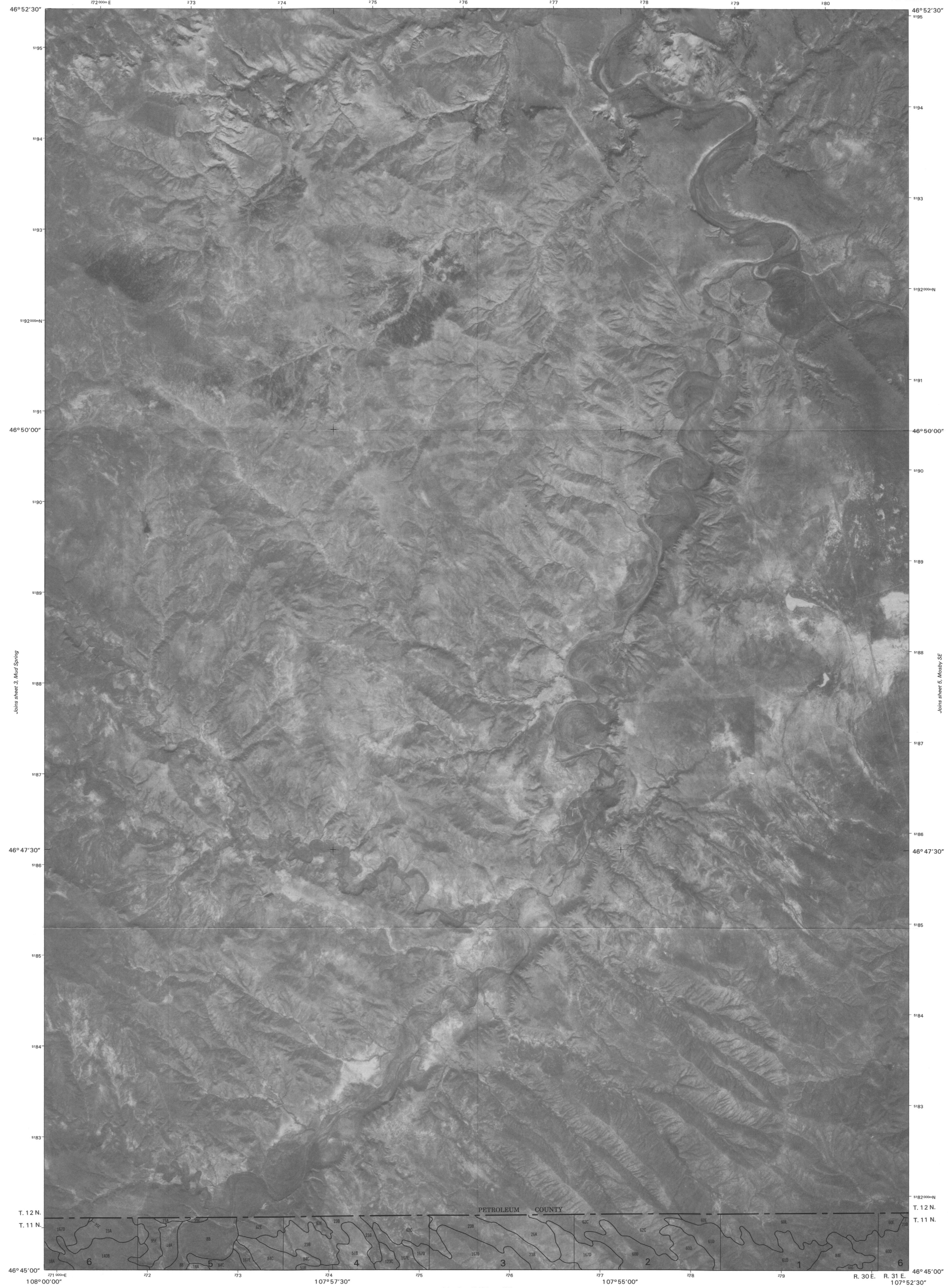
MILES

QUADRANGLE LOCATION

MUD SPRING, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 3 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MAXWELL RANCH QUADRANGLE
SHEET NUMBER 4 OF 48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R. 30 E.
R. 31 E.
PETROLEUM COUNTY
167D
95E
23A
140B
38A
6
14A
8B
5
84C
62E
167E
23B
51B
4
62C
123C
3
26A
167D
2
60D
61D
60E
1
84E
Joins sheet 3, Mud Spring
Joins sheet 5, Mosby SE
Joins sheet 14, Melstone NW
Joins sheet 13, Akers Ranch
Joins sheet 15, Melstone NE

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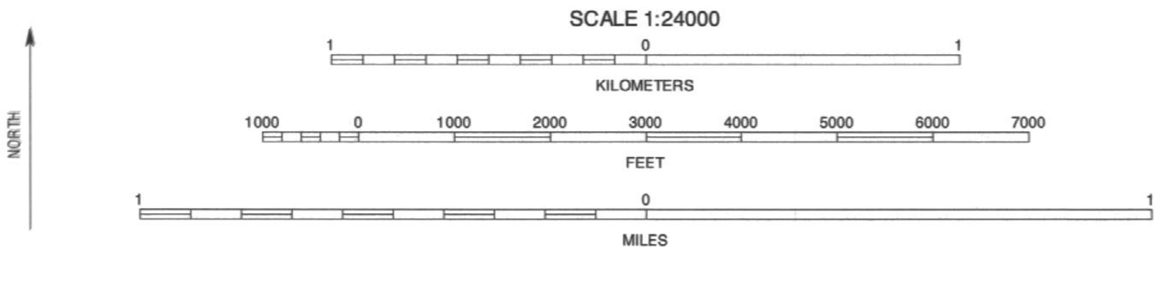
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 13.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

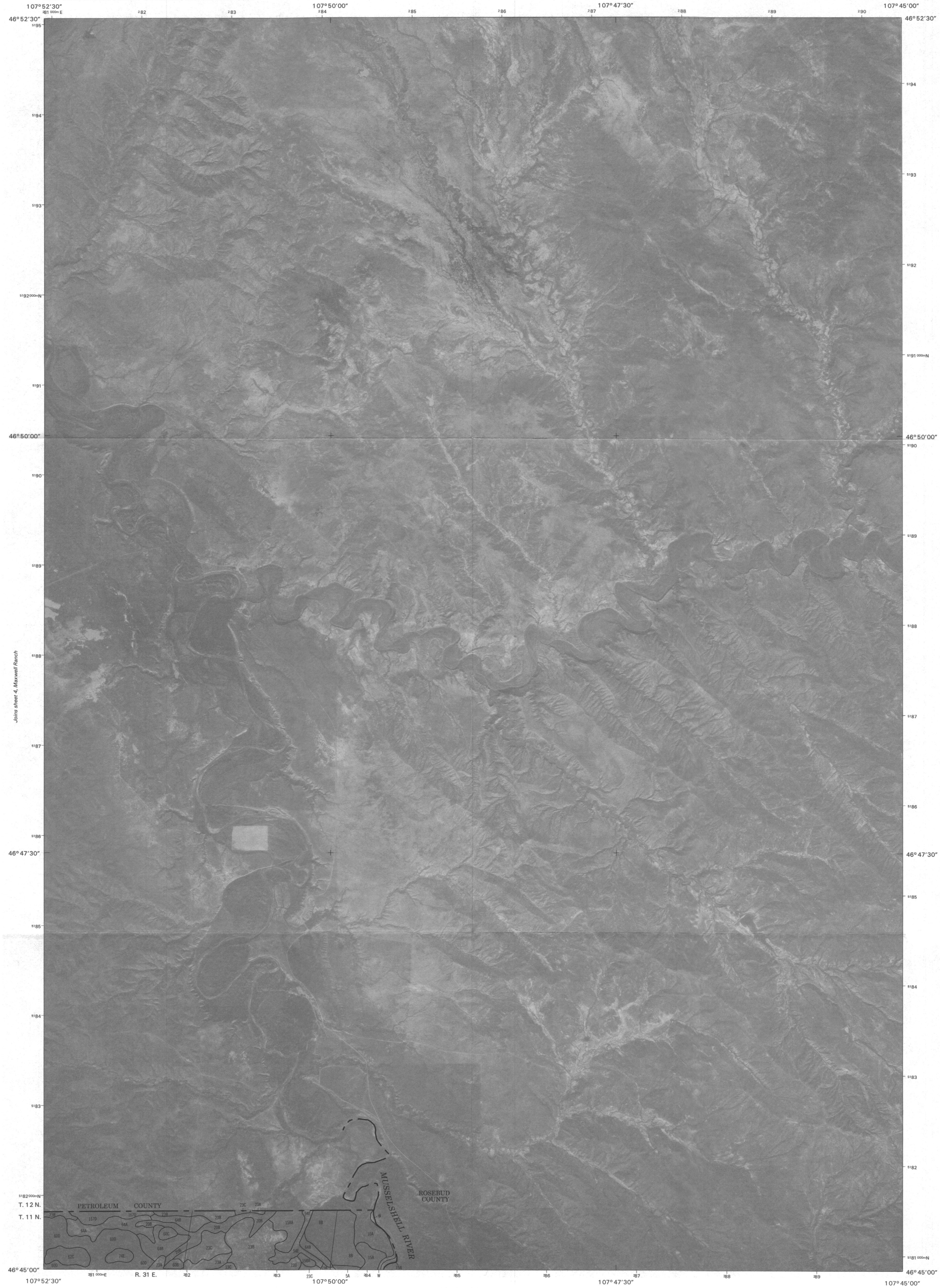

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

MAXWELL RANCH, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 4 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MOSBY SE QUADRANGLE
SHEET NUMBER 5 OF 48


107°52'30"
281 000m E
282
283
107°50'00"
284
285
286
287
107°47'30"
288
289
290
107°45'00"
46°52'30"
5195
5194
5193
5192 000m N
5191 000m N
5191
46°50'00"
5190
5189
5188
5187
5186
5185
46°47'30"
5184
5183
5182
5182 000m N
5181 000m N
46°45'00"
Joins sheet 4, Maxwell Ranch
T. 12 N.
T. 11 N.
R. 31 E.
PETROLEUM COUNTY
ROSEBUD COUNTY
MUSSELSHELL RIVER
60D
64A
20B
60C
62C
74E
64B
23A
23C
23B
60B
5A
W
Joins sheet 15, Melstone NE
Joins sheet 14, Melstone NW

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 13.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

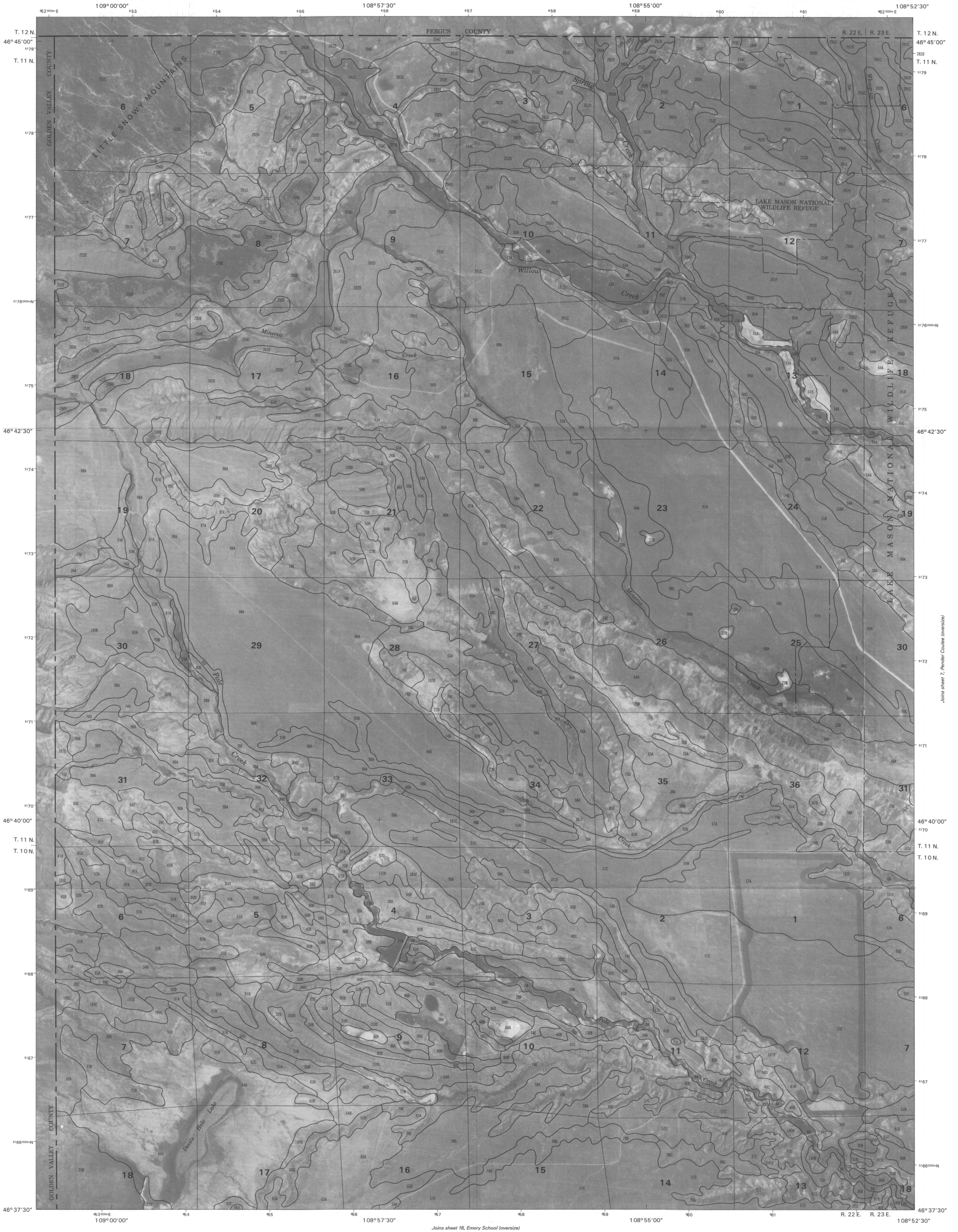
MOSBY SE, MONTANA

7.5 MINUTE SERIES
SHEET NUMBER 5 OF 48

QUADRANGLE LOCATION

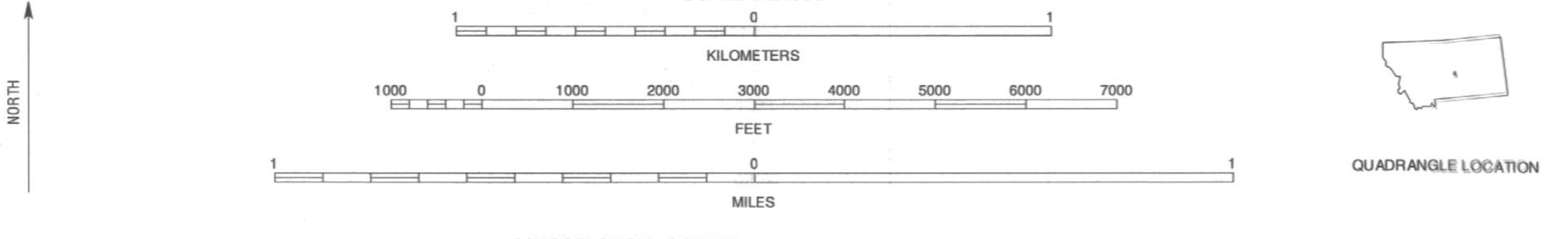
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
DEVILS HOLE LAKE (OVERSIZE) QUADRANGLE
SHEET NUMBER 6 OF 48


109°00'00"
108°57'30"
108°55'00"
108°52'30"
46°45'00"
46°42'30"
46°40'00"
46°37'30"
T. 12 N.
T. 11 N.
T. 10 N.
R. 22 E.
R. 23 E.
652000mE
653000mE
662000mE
5176000mN
5166000mN
FERGUS COUNTY
GOLDEN VALLEY COUNTY
LITTLE SNOWY MOUNTAINS
Spring Creek
Willow Creek
Minerva Creek
Pole Creek
Dry Creek
Whisky Creek
Devils Hole Lake
LAKE MASON NATIONAL WILDLIFE REFUGE
Joins sheet 7, Pender Coulee (oversize)
Joins sheet 16, Emory School (oversize)
Joins sheet 17, Timber Buttes North

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

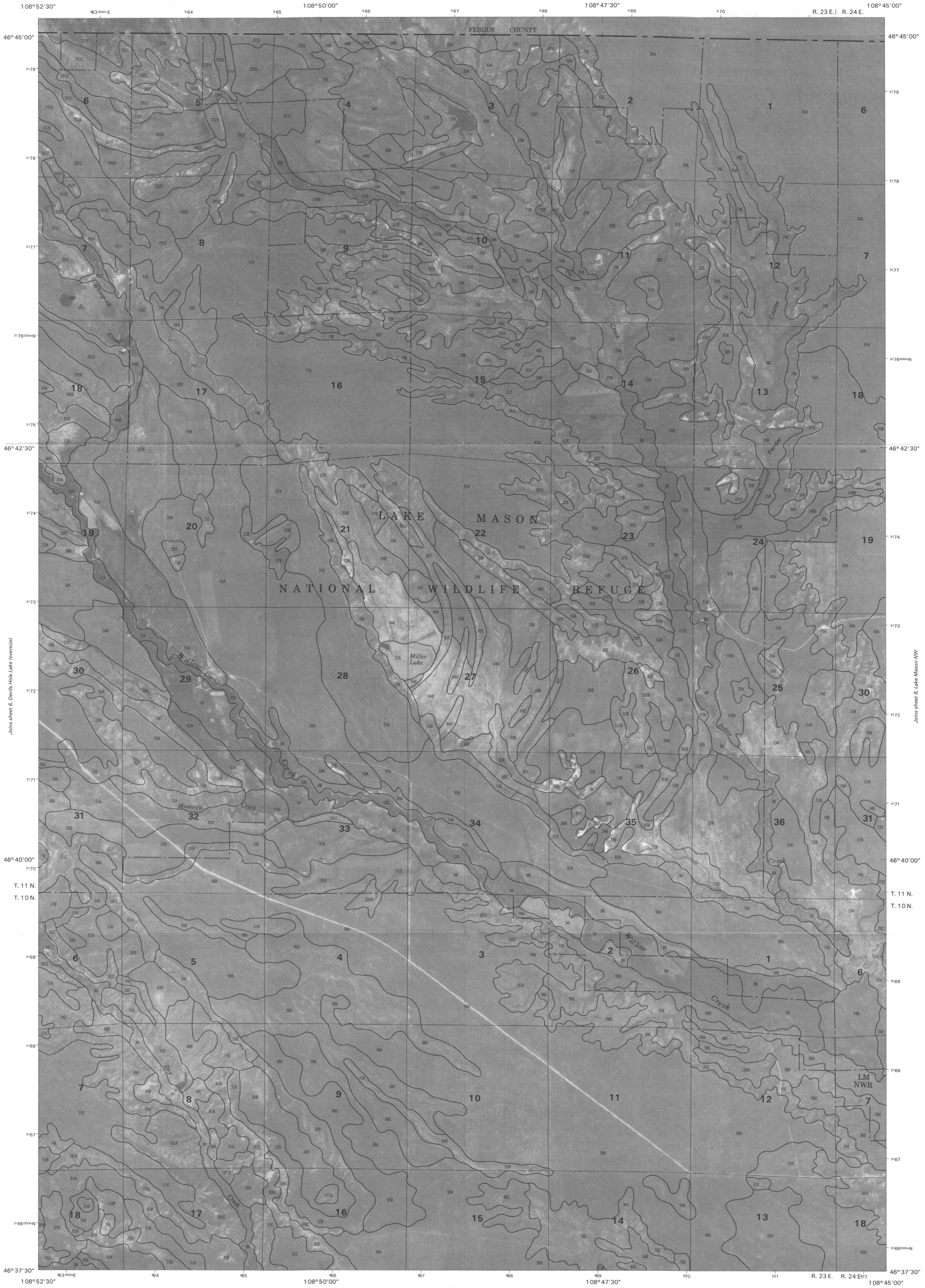
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES
QUADRANGLE LOCATION

DEVILS HOLE LAKE (OVERSIZE), MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 6 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
PENDER COULEE QUADRANGLE
SHEET NUMBER 7 OF 48


108°52'30"
108°50'00"
108°47'30"
108°45'00"
46°45'00"
46°42'30"
46°40'00"
46°37'30"
R. 23 E.
R. 24 E.
T. 11 N.
T. 10 N.
FERGUS COUNTY
LAKE MASON NATIONAL WILDLIFE REFUGE
Miller Lake
Willow Creek
Minerva Creek
Whoop-up Creek
Jones Creek
Pender Coulee
Dry Creek
LM NWR
Joins sheet 6, Devils Hole Lake (oversize)
Joins sheet 8, Lake Mason NW
Joins sheet 16, Emory School (oversize)
Joins sheet 17, Timber Buttes North
Joins sheet 18, Lake Mason

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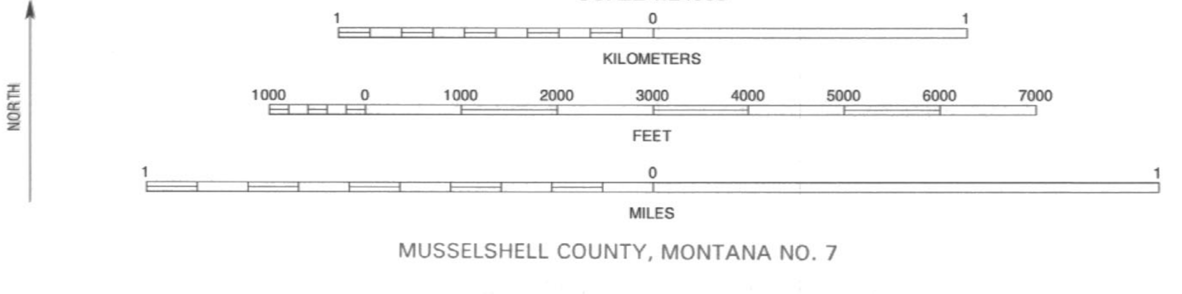
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

SCALE 1:24000


NORTH
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

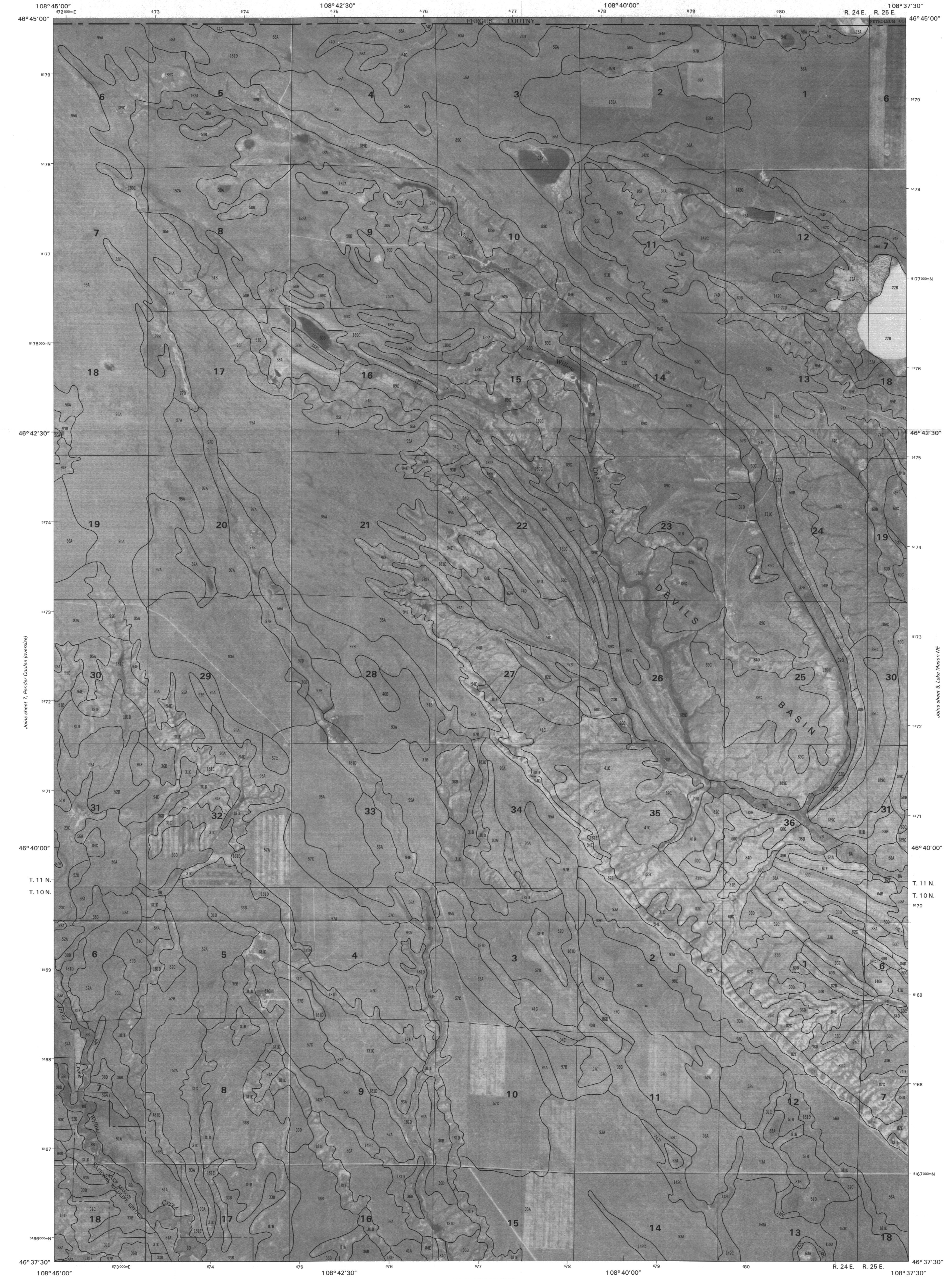
QUADRANGLE LOCATION

PENDER COULEE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 7 OF 48

MUSSELSHELL COUNTY, MONTANA NO. 7

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

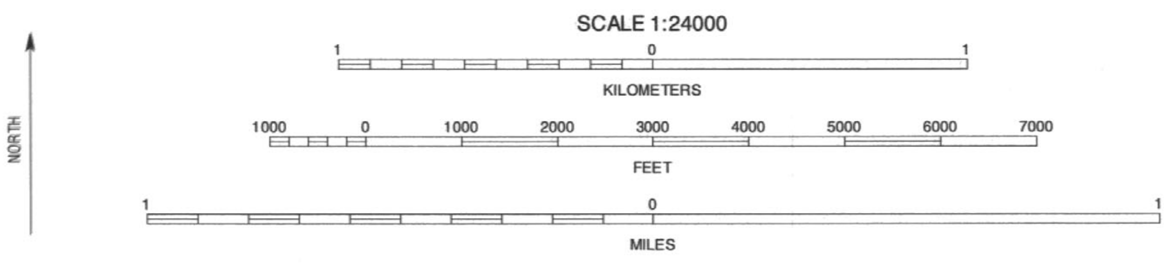
MUSSELSHELL COUNTY, MONTANA
LAKE MASON NW QUADRANGLE
SHEET NUMBER 8 OF 48



108° 45′00″
108° 42′30″
108° 40′00″
108° 37′30″
46° 45′00″
46° 42′30″
46° 40′00″
46° 37′30″
672000m E
673
674
675
676
677
678
679
680
673000m E
5179
5178
5177
5177000m N
5176000m N
5176
5175
5174
5173
5172
5171
5170
5169
5168
5167
5167000m N
5166000m N
R. 24 E.
R. 25 E.
T. 11 N.
T. 10 N.
FERGUS COUTNY
PETROLEUM CO
North Willow Creek
DEVILS BASIN
Jones Creek
Willow Creek
LAKE MASON NATIONAL WILDLIFE REFUGE
Joins sheet 7, Pender Coulee (oversize)
Joins sheet 9, Lake Mason NE
Joins sheet 18, Lake Mason
Joins sheet 17, Timber Buttes North
Joins sheet 19, Lake Mason SE

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



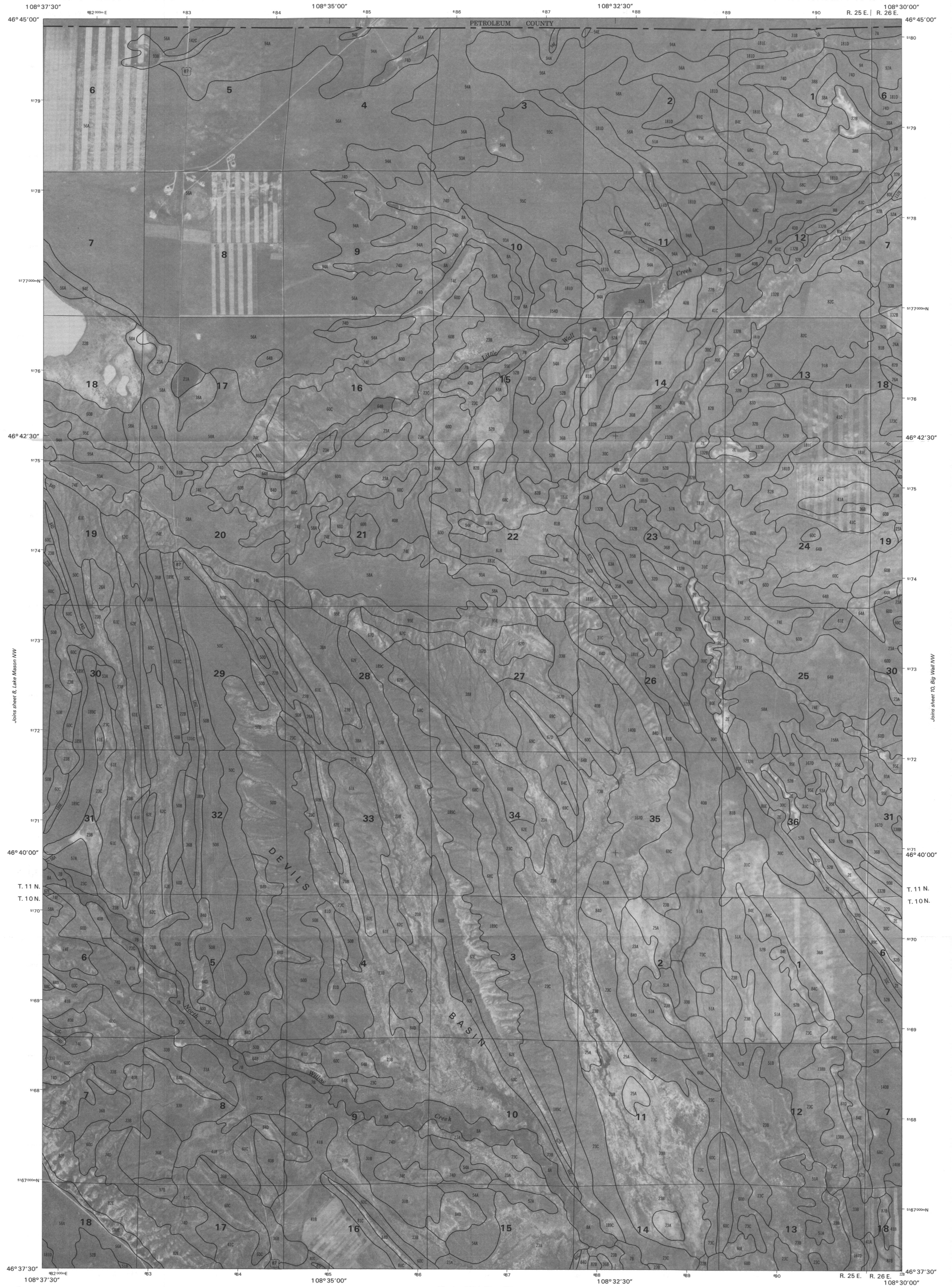
NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

LAKE MASON NW, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 8 OF 48

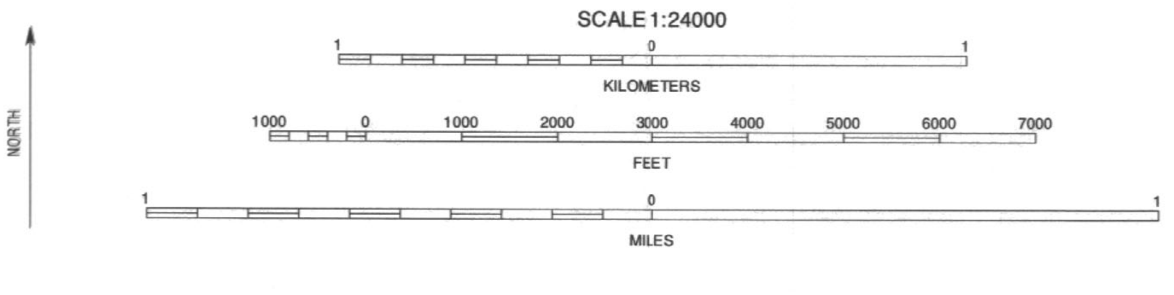
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
LAKE MASON NE QUADRANGLE
SHEET NUMBER 9 OF 48


108° 37′30″
108° 35′00″
108° 32′30″
108° 30′00″
46° 45′00″
46° 42′30″
46° 40′00″
46° 37′30″
682 000m E
683
684
685
686
687
688
689
690
R. 25 E.
R. 26 E.
5180
5179
5178
5177 000m N
5176
5175
5174
5173
5172
5171
5170
5169
5168
5167 000m N
T. 11 N.
T. 10 N.
PETROLEUM COUNTY
Little Wall Creek
DEVILS BASIN
North Willow Creek
87
Joins sheet 8, Lake Mason NW
Joins sheet 10, Big Wall NW
Joins sheet 19, Lake Mason SE
Joins sheet 18, Lake Mason
Joins sheet 20, Big Wall West

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

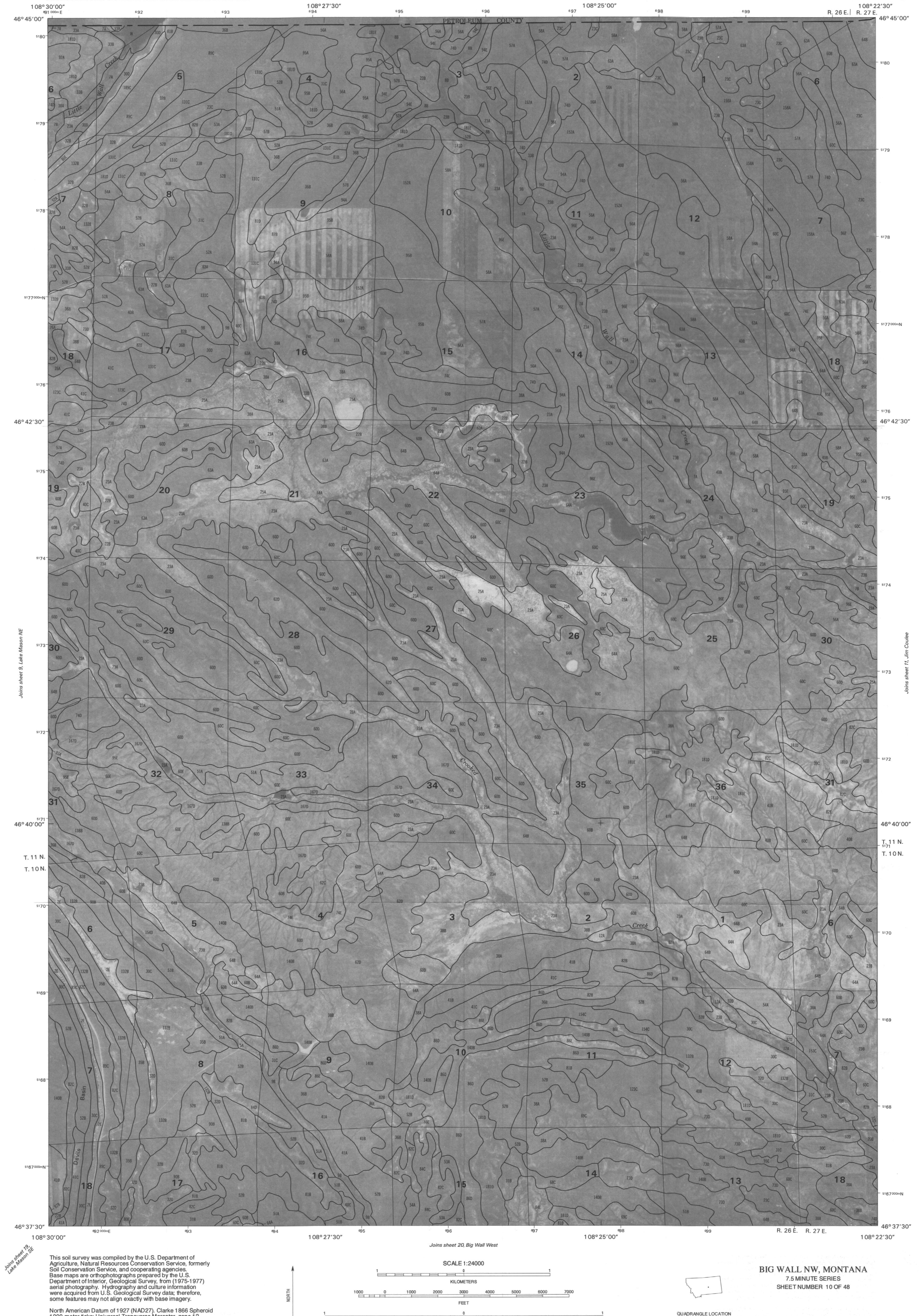

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

LAKE MASON NE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 9 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
BIG WALL NW QUADRANGLE
SHEET NUMBER 10 OF 48


Joins sheet 1, Crowley Dam
108° 30′00″
108° 27′30″
108° 25′00″
108° 22′30″
46° 45′00″
46° 42′30″
46° 40′00″
46° 37′30″
691 000m E
692
693
694
695
696
697
698
699
5180
5179
5178
5177 000m N
5176
5175
5174
5173
5172
5171
5170
5169
5168
5167 000m N
R. 26 E.
R. 27 E.
T. 11 N.
T. 10 N.
PETROLEUM COUNTY
Little Wall Creek
Little Wall Creek
Crooked Creek
Creek
Devils Basin
Joins sheet 9, Lake Mason NE
Joins sheet 11, Jim Coulee
Joins sheet 19, Lake Mason SE
Joins sheet 20, Big Wall West
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES
NORTH

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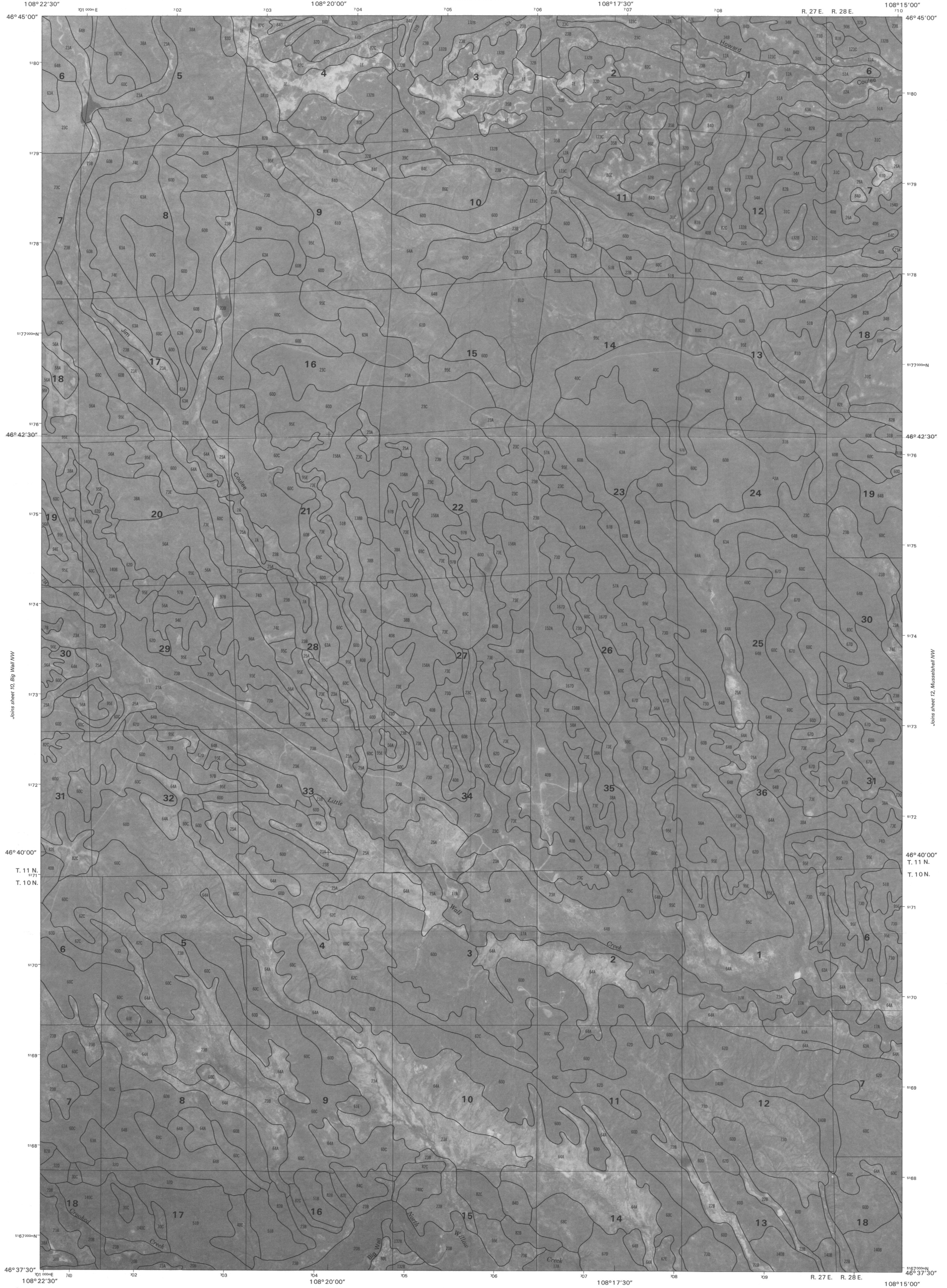
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

BIG WALL NW, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 10 OF 48

QUADRANGLE LOCATION

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
JIM COULEE QUADRANGLE
SHEET NUMBER 11 OF 48


Joins sheet 1, Crowley Dam
Joins sheet 2, Kelley
Joins sheet 10, Big Wall NW
Joins sheet 12, Musselshell NW
Joins sheet 20, Big Wall West
Joins sheet 21, Big Wall East
Joins sheet 22, Delphia
108° 22′30″
108° 20′00″
108° 17′30″
108° 15′00″
46° 45′00″
46° 42′30″
46° 40′00″
46° 37′30″
701 000m E
5177 000m N
5167 000m N
R. 27 E.
R. 28 E.
T. 11 N.
T. 10 N.
Jim
Coulee
Howard
Coulee
Little
Wall
Creek
Crooked
Creek
Big Wall
North
Willow
Creek

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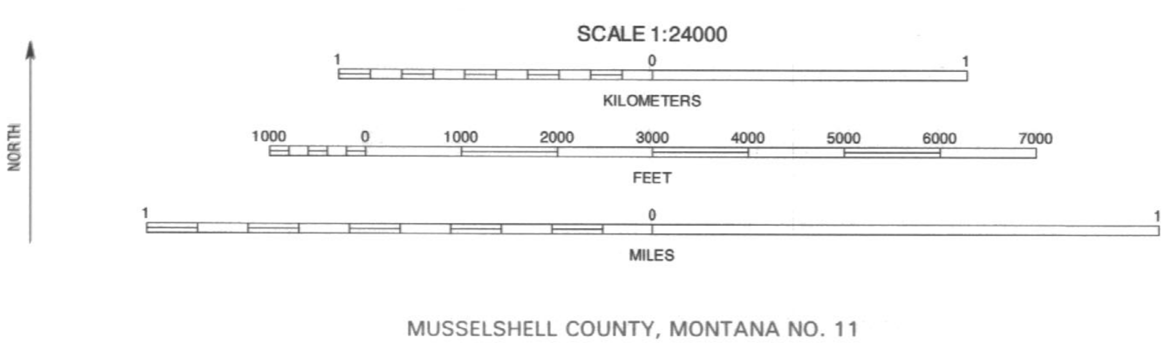
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

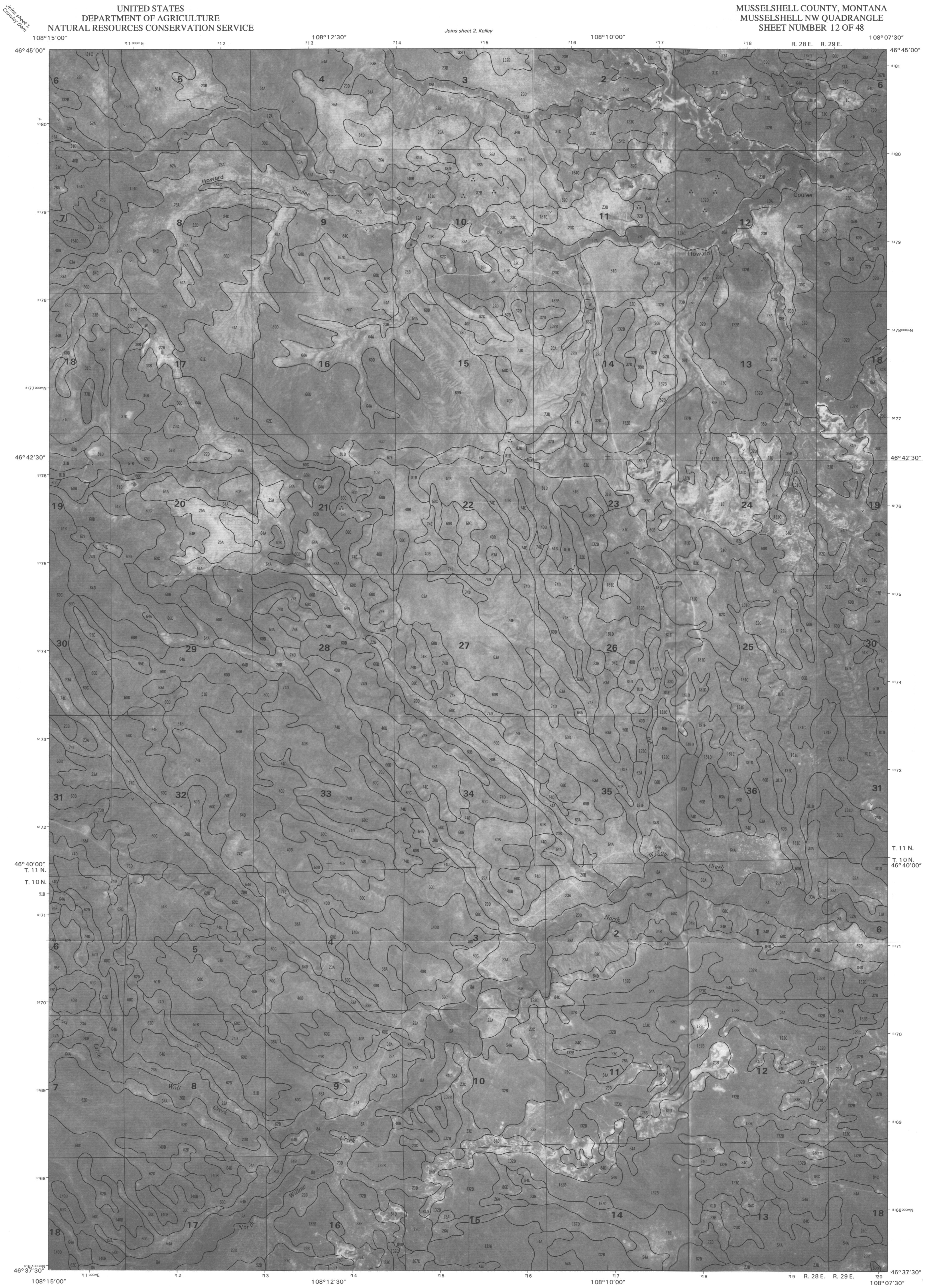

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

JIM COULEE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 11 OF 48

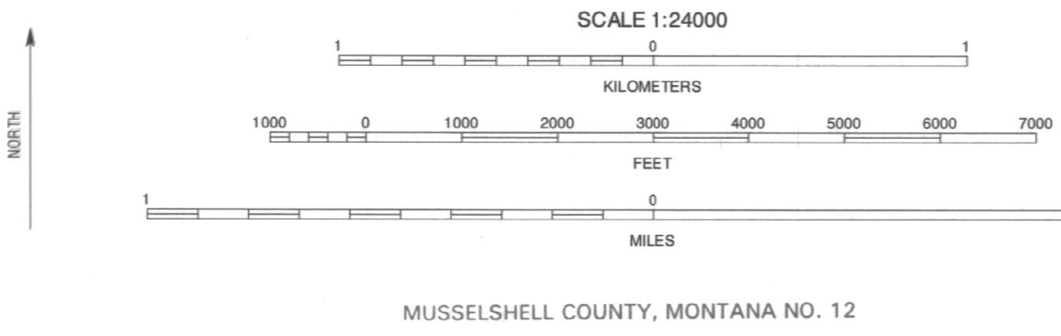
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MUSSELSHELL NW QUADRANGLE
SHEET NUMBER 12 OF 48


Joins sheet 1, Crowley Dam
Joins sheet 2, Kelley
108°15′00″
108°12′30″
108°10′00″
108°07′30″
46°45′00″
46°42′30″
46°40′00″
46°37′30″
R. 28 E.
R. 29 E.
T. 11 N.
T. 10 N.
Howard Coulee
Willow Creek
North Willow Creek
Little Wall Creek
711 000m E
5178 000m N
5177 000m N
5168 000m N
5167 000m N

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

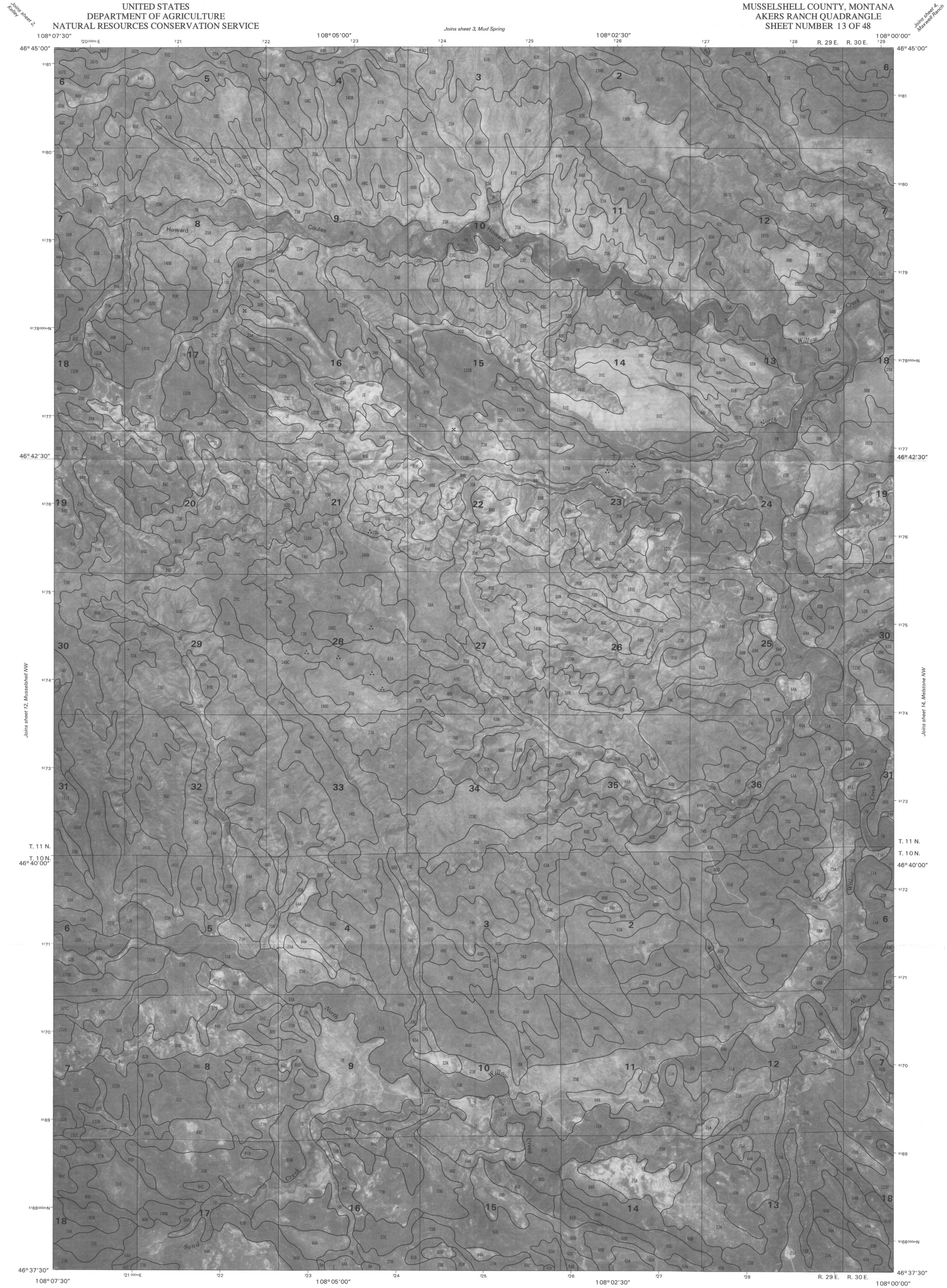

NORTH
SCALE 1:24000
KILOMETERS
FEET
MILES
1
0
1000
2000
3000
4000
5000
6000
7000

QUADRANGLE LOCATION

MUSSELSHELL NW, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 12 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
AKERS RANCH QUADRANGLE
SHEET NUMBER 13 OF 48


Joins sheet 2, Kelley
Joins sheet 3, Mud Spring
Joins sheet 4, Maxwell Ranch
Joins sheet 12, Musselshell NW
Joins sheet 14, Melstone NW
Joins sheet 22, Delphia
Joins sheet 23, Musselshell
Joins sheet 24, Queens Point
108°07′30″
108°05′00″
108°02′30″
108°00′00″
46°45′00″
46°42′30″
46°40′00″
46°37′30″
720 000m E
721 000m E
722
723
724
725
726
727
728
729
5181
5180
5179
5178 000m N
5177
5176
5175
5174
5173
5172
5171
5170
5169
5168 000m N
R. 29 E.
R. 30 E.
T. 11 N.
T. 10 N.
Howard
Coulee
Howard
Coulee
Willow
Creek
North
North
Willow
Creek
Willow
Creek
Sand
Creek
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

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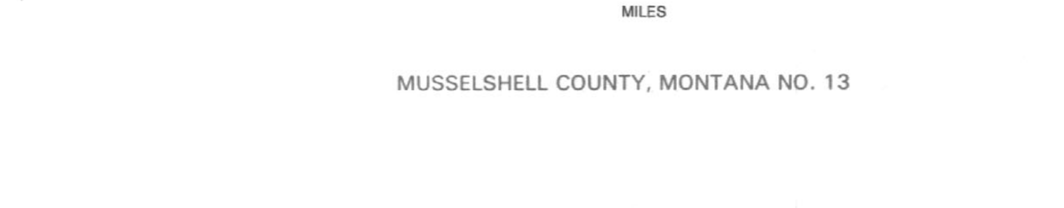
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

SCALE 1:24000

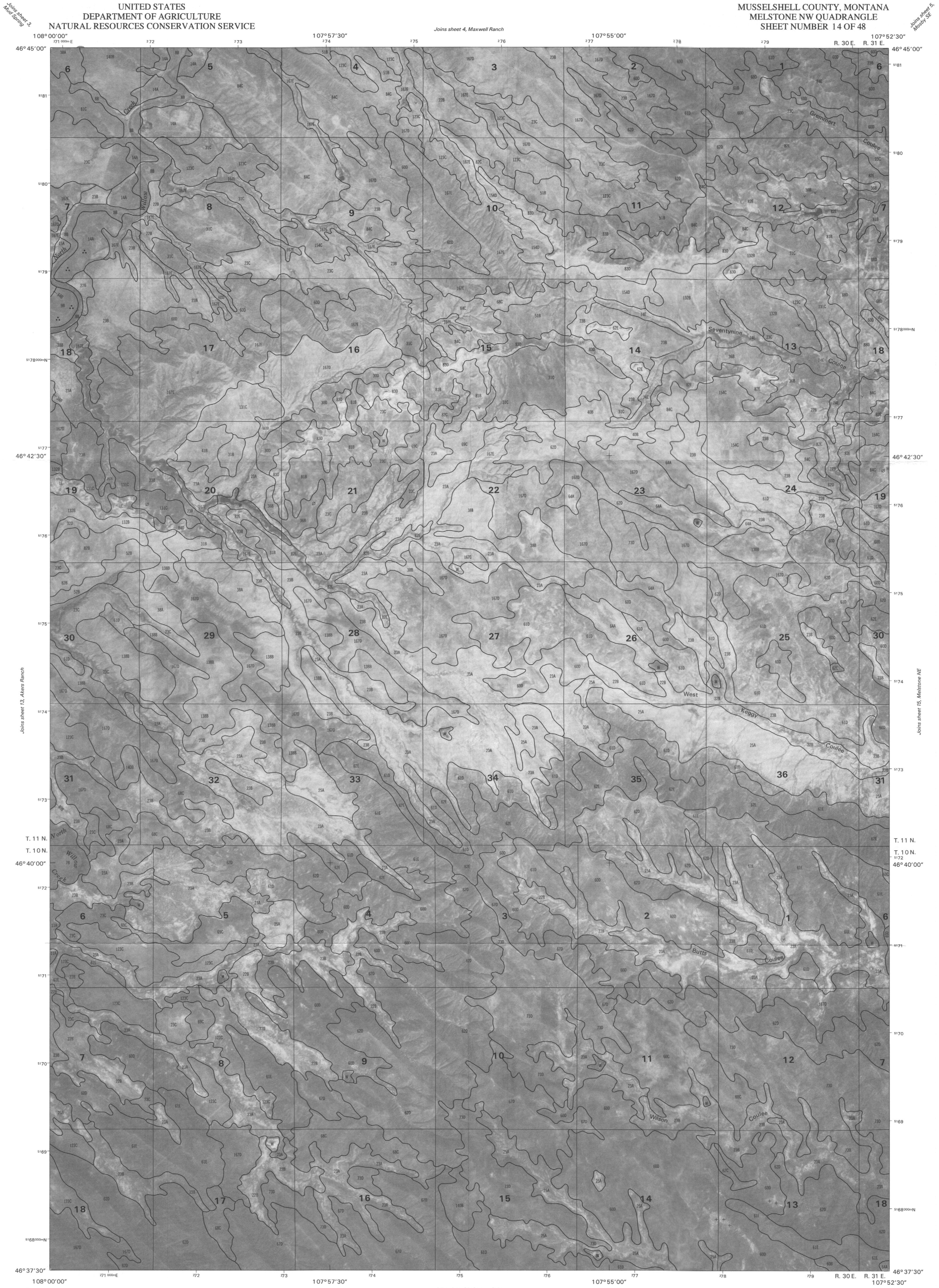

NORTH
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

AKERS RANCH, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 13 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MELSTONE NW QUADRANGLE
SHEET NUMBER 14 OF 48


Joins sheet 3, Mud Spring
Joins sheet 4, Maxwell Ranch
Joins sheet 5, Mosby SE
Joins sheet 13, Akers Ranch
Joins sheet 15, Melstone NE
Joins sheet 23, Musselshell
Joins sheet 24, Queens Point
Joins sheet 25, Melstone
108°00'00"
107°57'30"
107°55'00"
107°52'30"
46°45'00"
46°42'30"
46°40'00"
46°37'30"
271 000m E
272
273
274
275
276
277
278
279
5178 000m N
5168 000m N
R. 30 E.
R. 31 E.
T. 11 N.
T. 10 N.
North Willow Creek
Gremmert Coulee
Seventynine Coulee
West Keggy Coulee
Butts Coulee
Wilson Coulee
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

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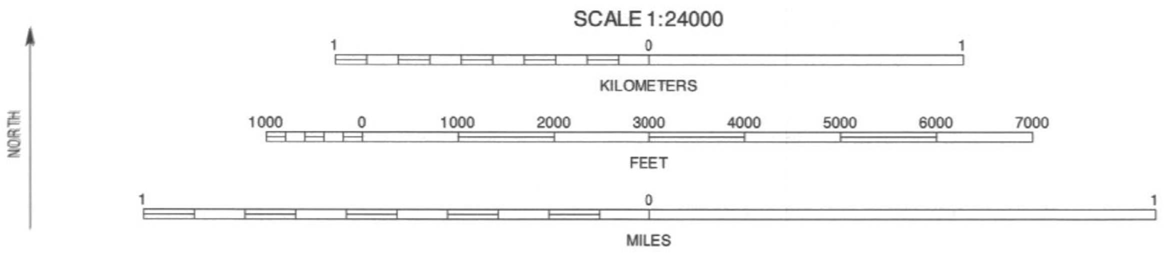
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

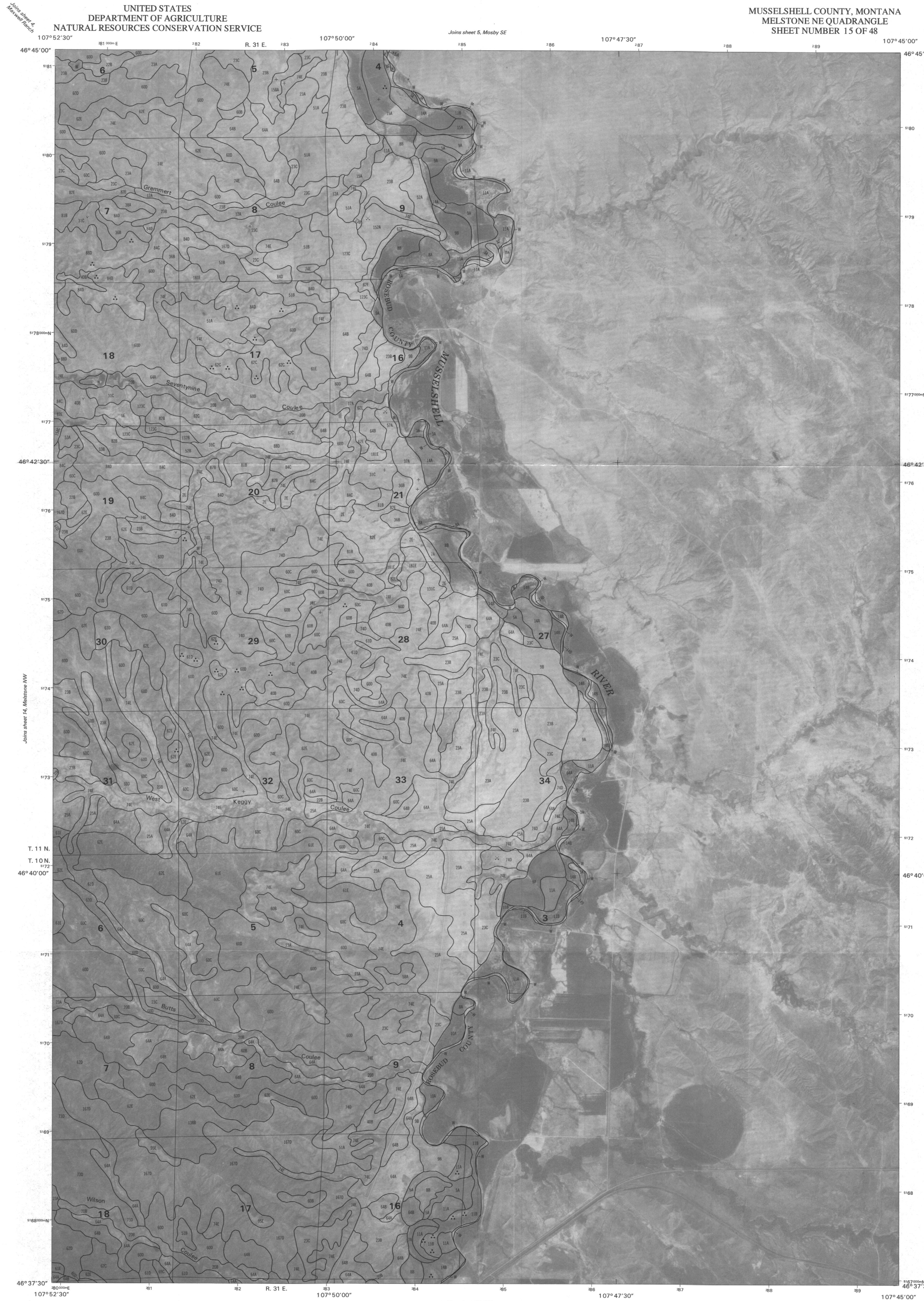

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

MELSTONE NW, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 14 OF 48

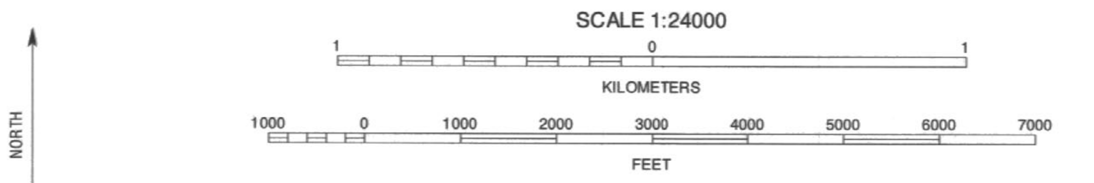
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MELSTONE NE QUADRANGLE
SHEET NUMBER 15 OF 48


Joins sheet 4, Maxwell Ranch
Joins sheet 5, Mosby SE
Joins sheet 14, Melstone NW
Joins sheet 24, Queens Point
Joins sheet 25, Melstone
107°52'30"
107°50'00"
107°47'30"
107°45'00"
46°45'00"
46°42'30"
46°40'00"
46°37'30"
²81 000m E
²82
²83
²84
²85
²86
²87
²88
²89
²80 000m E
R. 31 E.
T. 11 N.
T. 10 N.
⁵181
⁵180
⁵179
⁵178
⁵178 000m N
⁵177
⁵177 000m N
⁵176
⁵175
⁵174
⁵173
⁵172
⁵171
⁵170
⁵169
⁵168
⁵168 000m N
⁵167 000m N
Gremmert Coulee
Seventynine Coulee
West Keggy Coulee
Butts Coulee
Wilson Coulee
ROSEBUD COUNTY
MUSSELSHELL RIVER
6
5
4
7
8
9
18
17
16
19
20
21
30
29
28
27
31
32
33
34
3

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

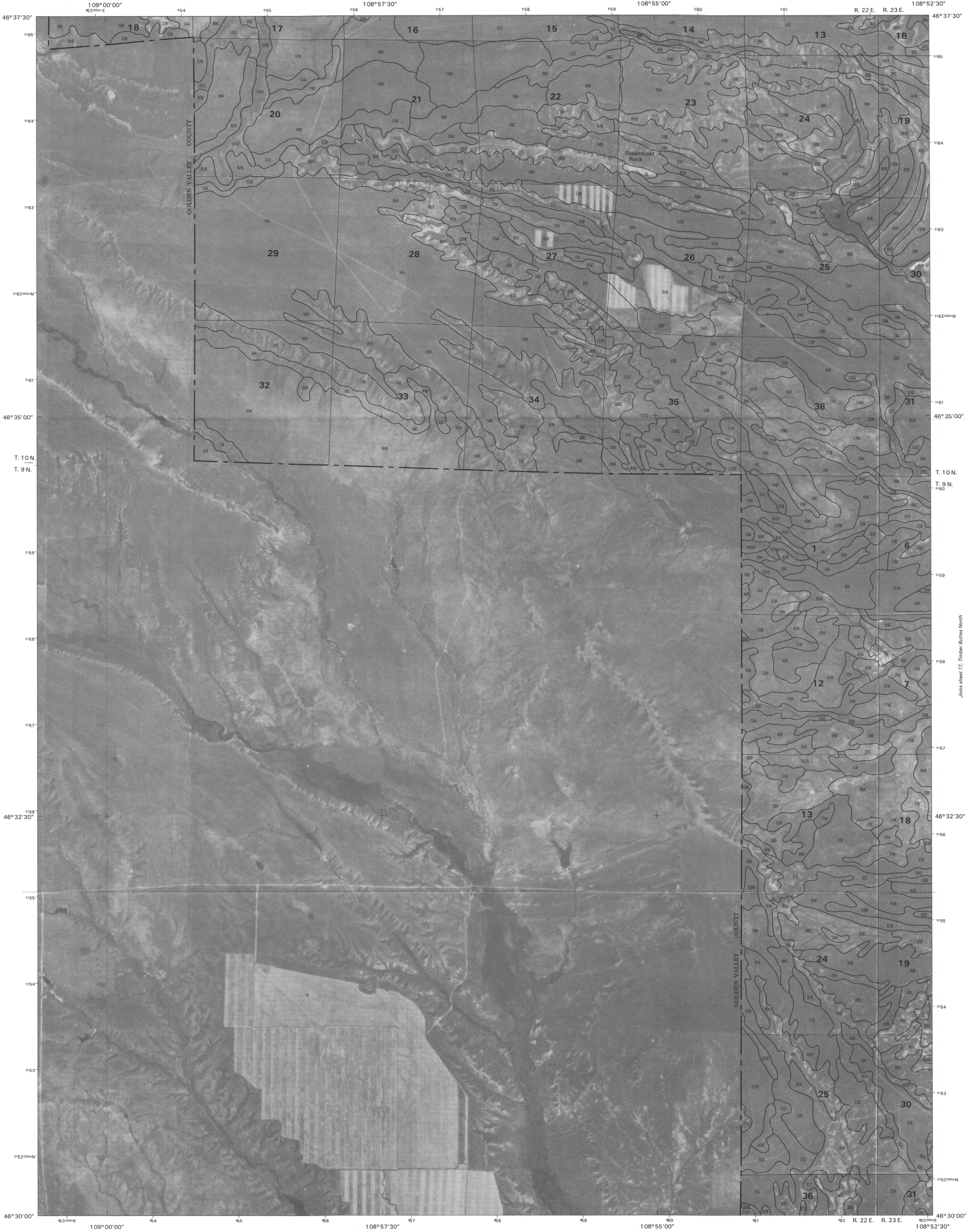
MELSTONE NE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 15 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
EMORY SCHOOL (OVERSIZE) QUADRANGLE
SHEET NUMBER 16 OF 48

Joins sheet 6, Devils Hole Lake (oversize)

Joins sheet 7, Pender Coulee (oversize)


46° 37′30″
109° 00′00″
653000mE
654
655
656
108° 57′30″
657
658
659
108° 55′00″
660
661
R. 22 E.
R. 23 E.
108° 52′30″
46° 37′30″
5165
5164
5163
5162000mN
5161
46° 35′00″
T. 10 N.
T. 9 N.
5160
5159
5158
5157
5156
46° 32′30″
5155
5154
5153
5152000mN
46° 30′00″
662
663000mE
GOLDEN VALLEY COUNTY
Steamboat Rock
18
17
16
15
14
13
18
20
21
22
23
24
19
29
28
27
26
25
30
32
33
34
35
36
31
1
6
12
7
13
18
24
19
25
30
36
31

Joins sheet 17, Timber Buttes North

Joins sheet 26, Lavina NW

Joins sheet 27, Timber Buttes South

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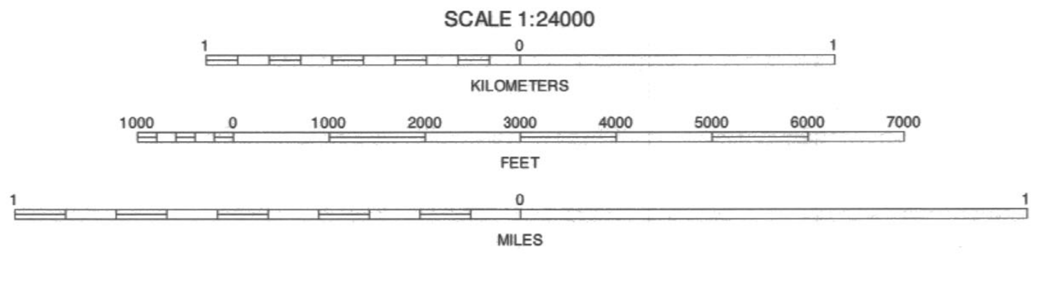
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

SCALE 1:24000


1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

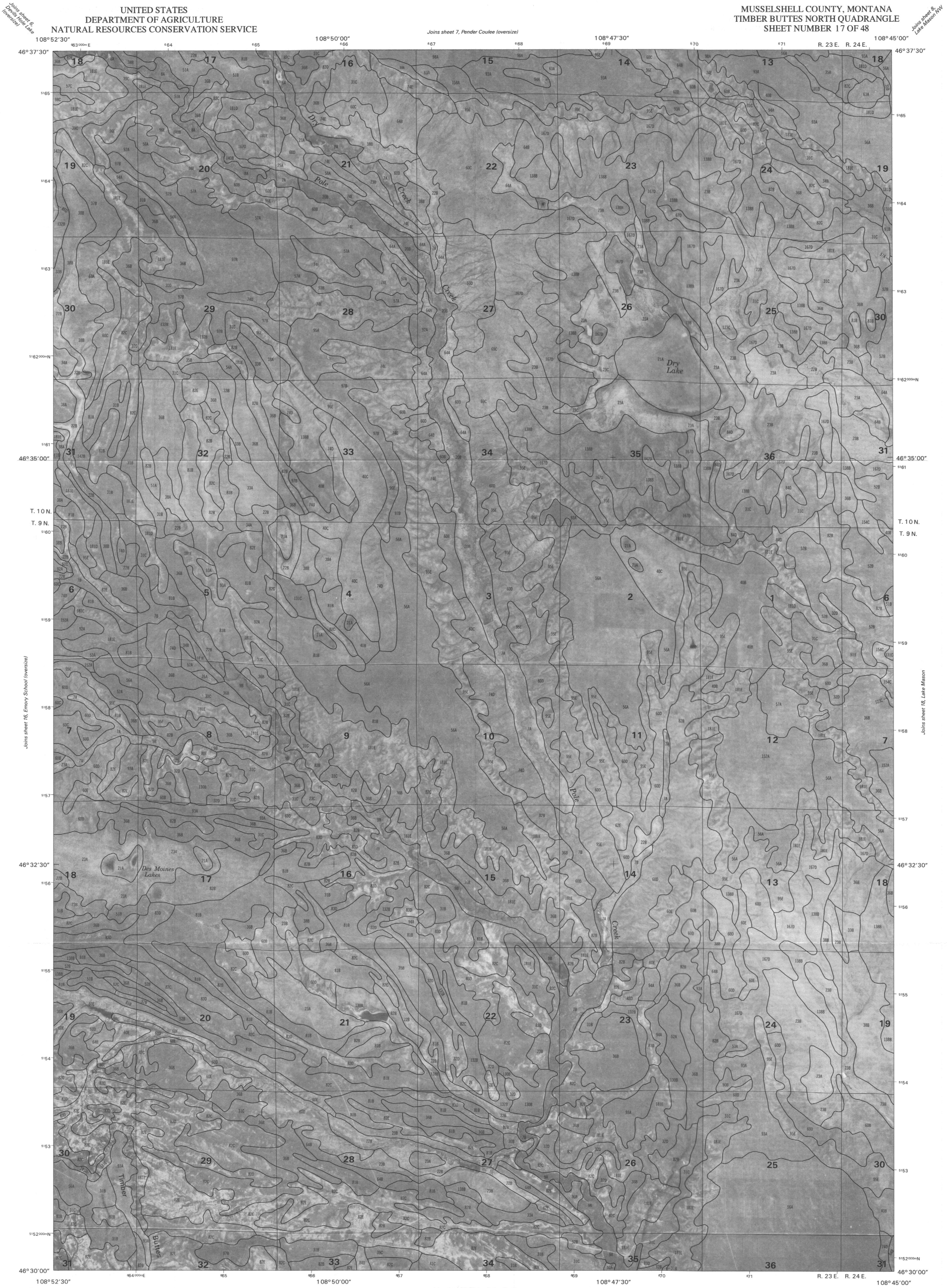
QUADRANGLE LOCATION

EMORY SCHOOL (OVERSIZE), MONTANA

7.5 MINUTE SERIES
SHEET NUMBER 16 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
TIMBER BUTTES NORTH QUADRANGLE
SHEET NUMBER 17 OF 48


Joins sheet 6, Devils Hole Lake (oversize)
Joins sheet 7, Pender Coulee (oversize)
Joins sheet 8, Lake Mason NW
Joins sheet 16, Emory School (oversize)
Joins sheet 18, Lake Mason
Joins sheet 26, Lavina NW
Joins sheet 27, Timber Buttes South
Joins sheet 28, Horsethief Creek
108°52'30"
108°50'00"
108°47'30"
108°45'00"
46°37'30"
46°35'00"
46°32'30"
46°30'00"
T. 10 N.
T. 9 N.
R. 23 E.
R. 24 E.
Dry Pole Creek
Dry Lake
Pole Creek
Des Moines Lakes
Timber Buttes

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

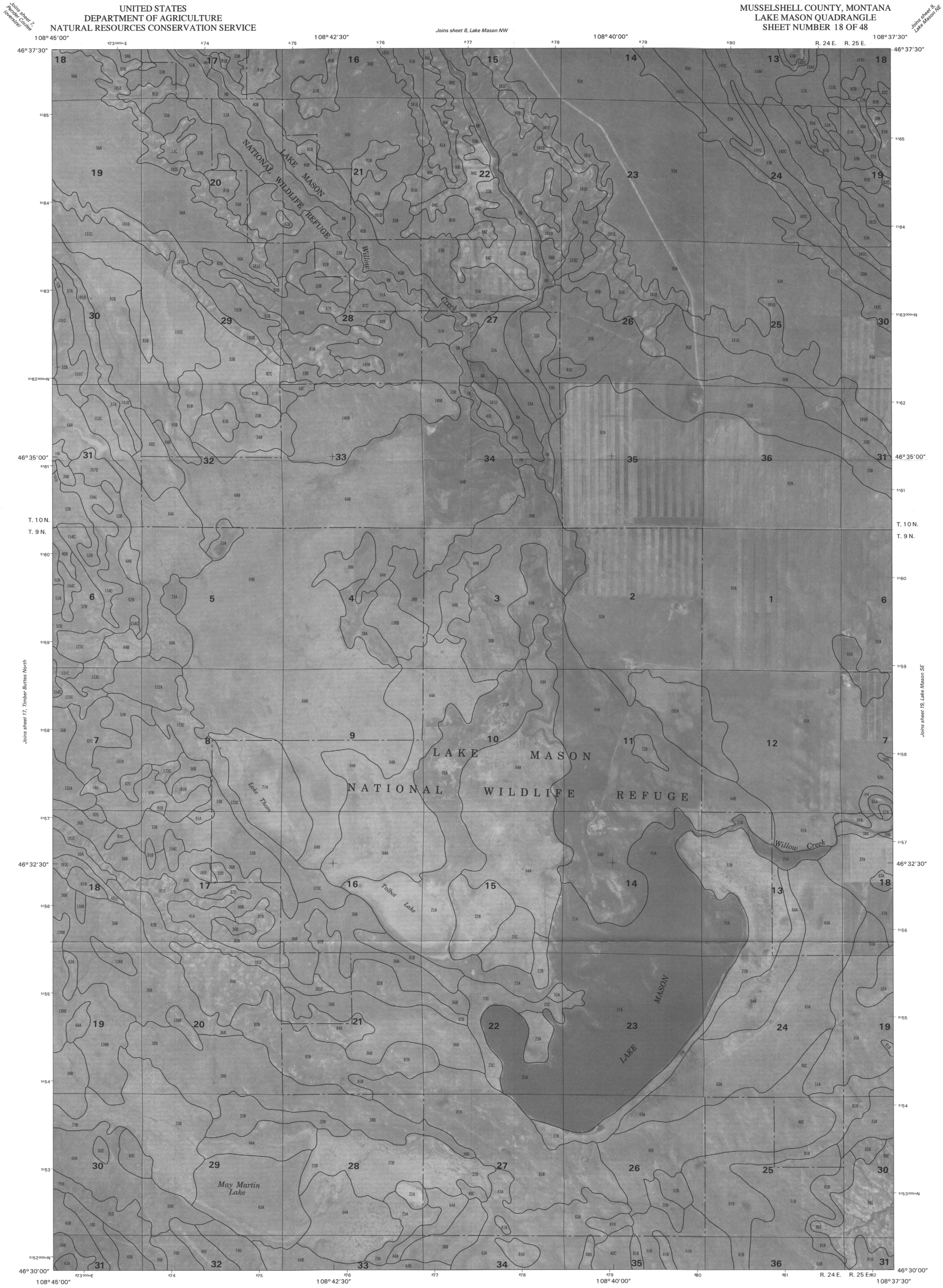
1 0 1
MILES

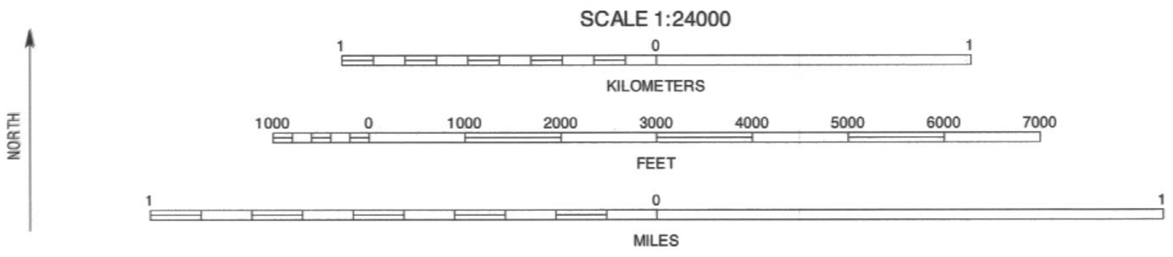
QUADRANGLE LOCATION

TIMBER BUTTES NORTH, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 17 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
LAKE MASON QUADRANGLE
SHEET NUMBER 18 OF 48


Joins sheet 7, Pender Coulee (oversize)
Joins sheet 8, Lake Mason NW
Joins sheet 9, Lake Mason NE
Joins sheet 17, Timber Buttes North
Joins sheet 19, Lake Mason SE
Joins sheet 27, Timber Buttes South
108° 45′00″
108° 42′30″
108° 40′00″
108° 37′30″
46° 37′30″
46° 35′00″
46° 32′30″
46° 30′00″
673000m E
674
675
676
677
678
679
680
681
682
5165
5164
5163
5163000m N
5162000m N
5162
5161
5160
5159
5158
5157
5156
5155
5154
5153
5153000m N
5152000m N
R. 24 E.
R. 25 E.
T. 10 N.
T. 9 N.
18
17
16
15
14
13
19
20
21
22
23
24
30
29
28
27
26
25
31
32
33
34
35
36
6
5
4
3
2
1
7
8
9
10
11
12
LAKE MASON NATIONAL WILDLIFE REFUGE
Willow Creek
LAKE MASON NATIONAL WILDLIFE REFUGE
Lake Thom
Willow Creek
Talbot Lake
LAKE MASON
May Martin Lake


SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES
NORTH

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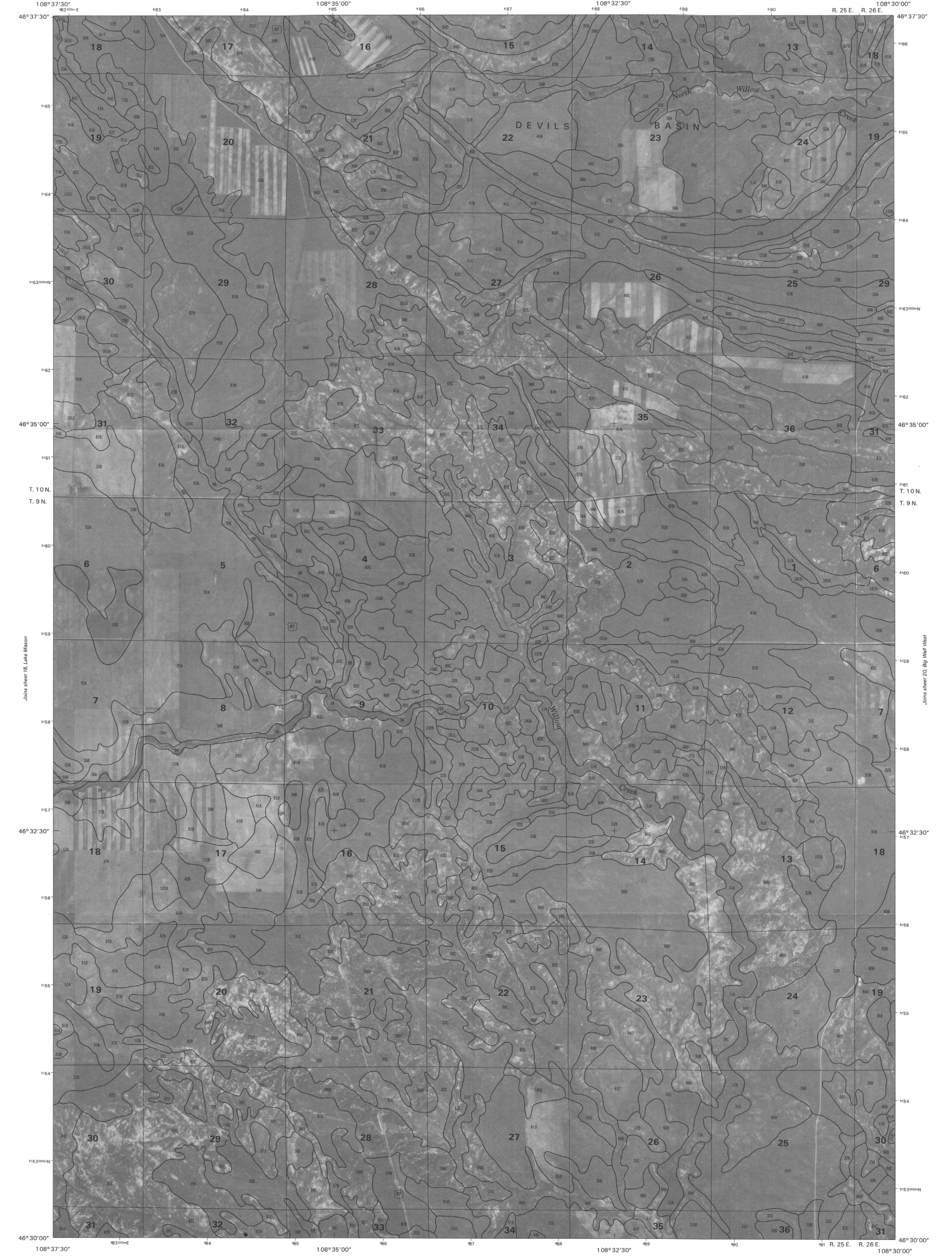
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

QUADRANGLE LOCATION

LAKE MASON, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 18 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
LAKE MASON SE QUADRANGLE
SHEET NUMBER 19 OF 48


Joins sheet 8, Lake Mason NW
Joins sheet 9, Lake Mason NE
Joins sheet 10, Big Wall NW
Joins sheet 18, Lake Mason
Joins sheet 20, Big Wall West
Joins sheet 28, Horsethief Creek
Joins sheet 29, Roundup
Joins sheet 30, Gage
108° 37′30″
108° 35′00″
108° 32′30″
108° 30′00″
46° 37′30″
46° 35′00″
46° 32′30″
46° 30′00″
682 000m E
683 000m E
5163 000m N
5153 000m N
R. 25 E.
R. 26 E.
T. 10 N.
T. 9 N.
DEVILS BASIN
North Willow Creek
Willow Creek
87
18
17
16
15
14
13
19
20
21
22
23
24
30
29
28
27
26
25
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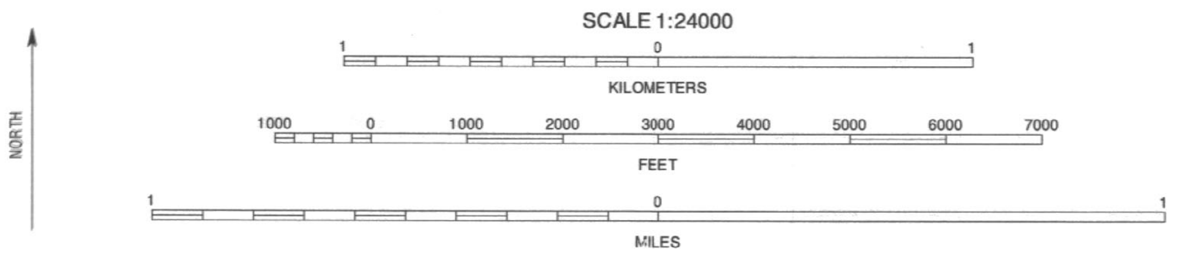
1
7
8
9
10
11
12


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

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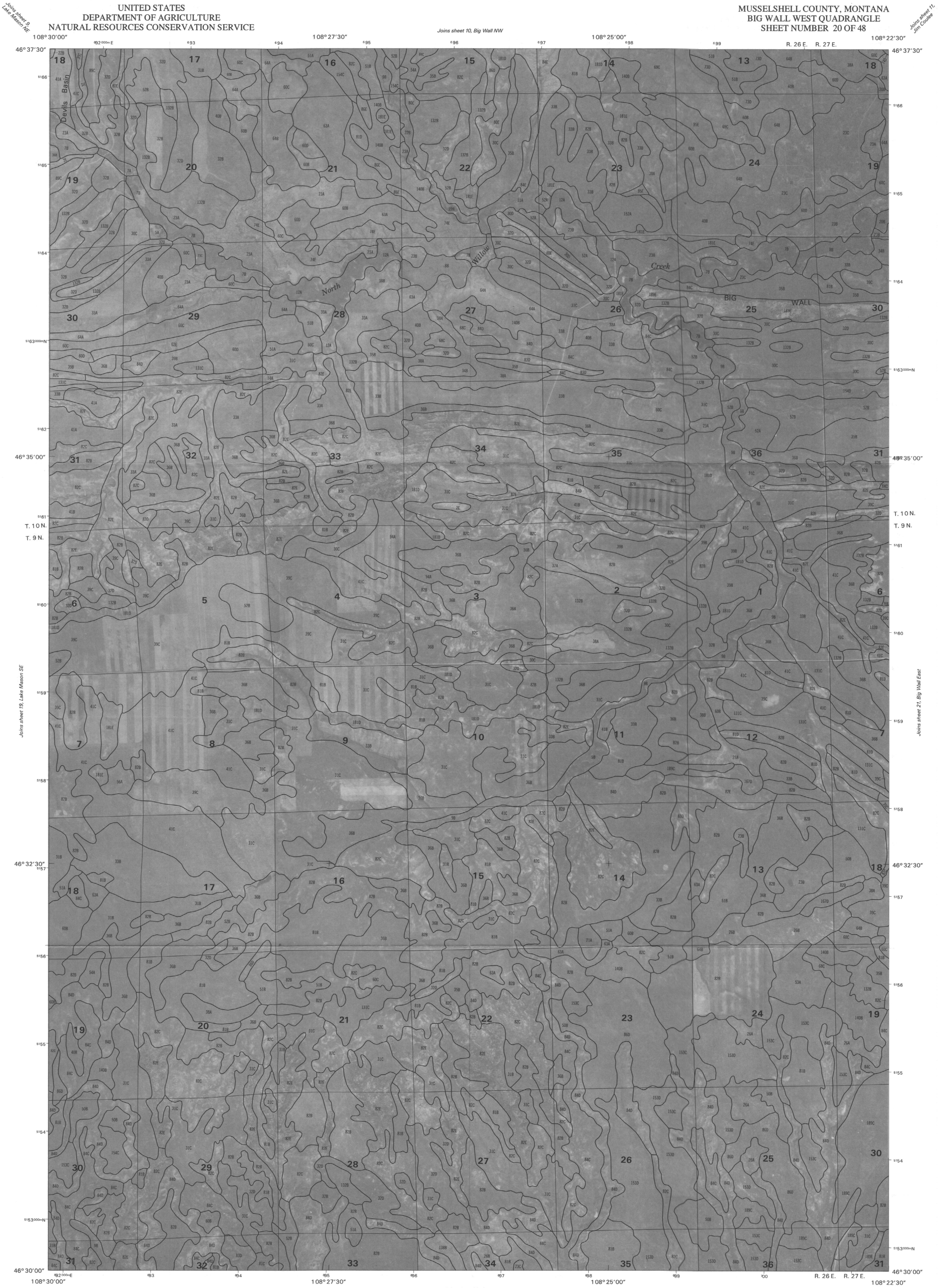
QUADRANGLE LOCATION

LAKE MASON SE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 19 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
BIG WALL WEST QUADRANGLE
SHEET NUMBER 20 OF 48


Joins sheet 9, Lake Mason NE
Joins sheet 10, Big Wall NW
Joins sheet 11, Jim Coulee
108° 30′00″
108° 27′30″
108° 25′00″
108° 22′30″
46° 37′30″
46° 35′00″
46° 32′30″
46° 30′00″
R. 26 E.
R. 27 E.
T. 10 N.
T. 9 N.
Devils Basin
North Willow Creek
BIG WALL
Joins sheet 19, Lake Mason SE
Joins sheet 21, Big Wall East
Joins sheet 29, Roundup
Joins sheet 30, Gage
Joins sheet 31, Gage NE

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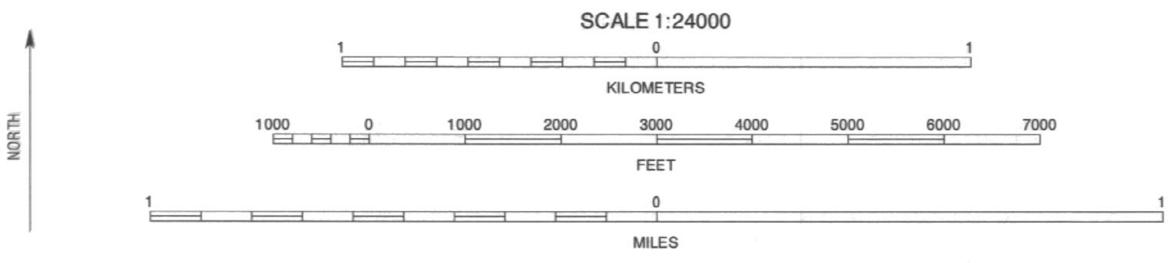
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

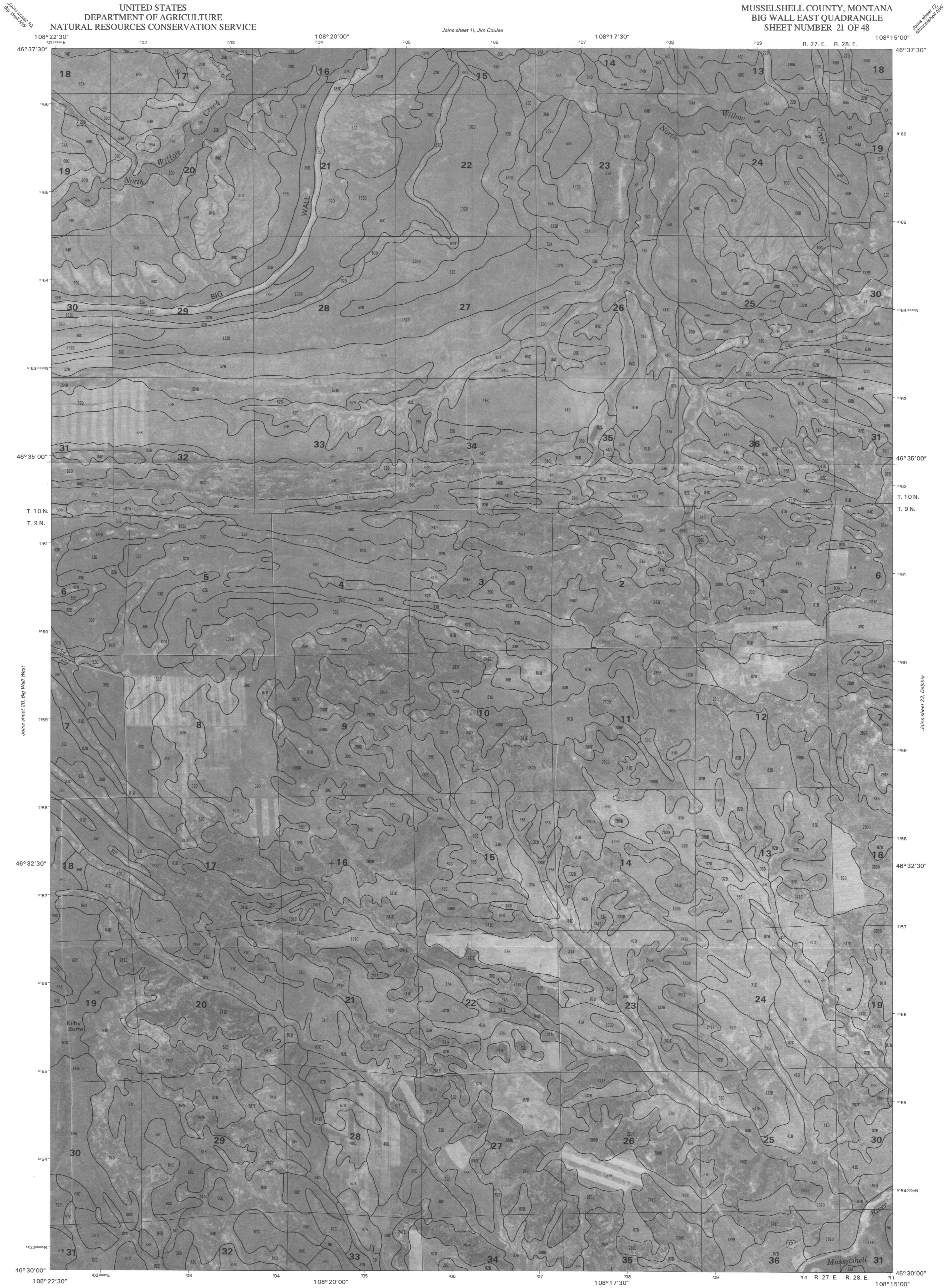

NORTH
SCALE 1:24000
KILOMETERS
FEET
MILES

QUADRANGLE LOCATION

BIG WALL WEST, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 20 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
BIG WALL EAST QUADRANGLE
SHEET NUMBER 21 OF 48


Joins sheet 10, Big Wall NW
Joins sheet 11, Jim Coulee
Joins sheet 12, Musselshell NW
108° 22'30"
108° 20'00"
108° 17'30"
108° 15'00"
46° 37'30"
46° 35'00"
46° 32'30"
46° 30'00"
701 000m E
5164 000m N
5163 000m N
5154 000m N
5153 000m N
R. 27 E.
R. 28 E.
T. 10 N.
T. 9 N.
North Willow Creek
BIG WALL
Kilby Butte
Musselshell River
Joins sheet 20, Big Wall West
Joins sheet 22, Delphia
Joins sheet 30, Gage
Joins sheet 31, Gage NE
Joins sheet 32, Chimney Butte

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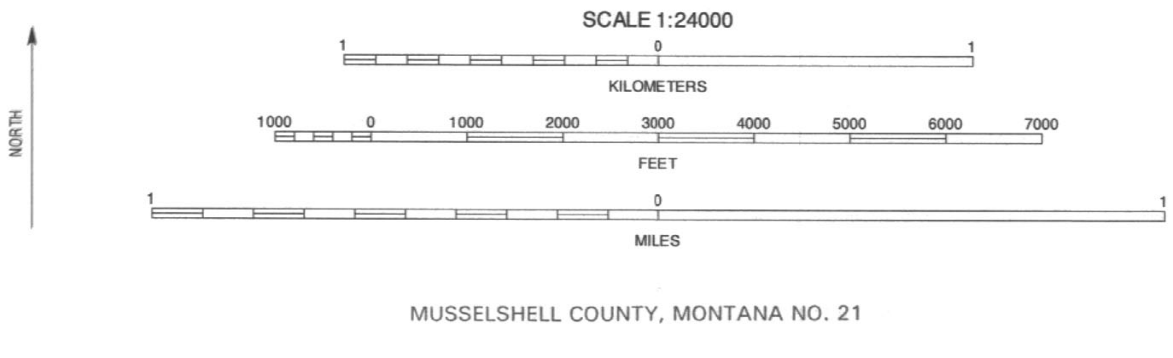
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

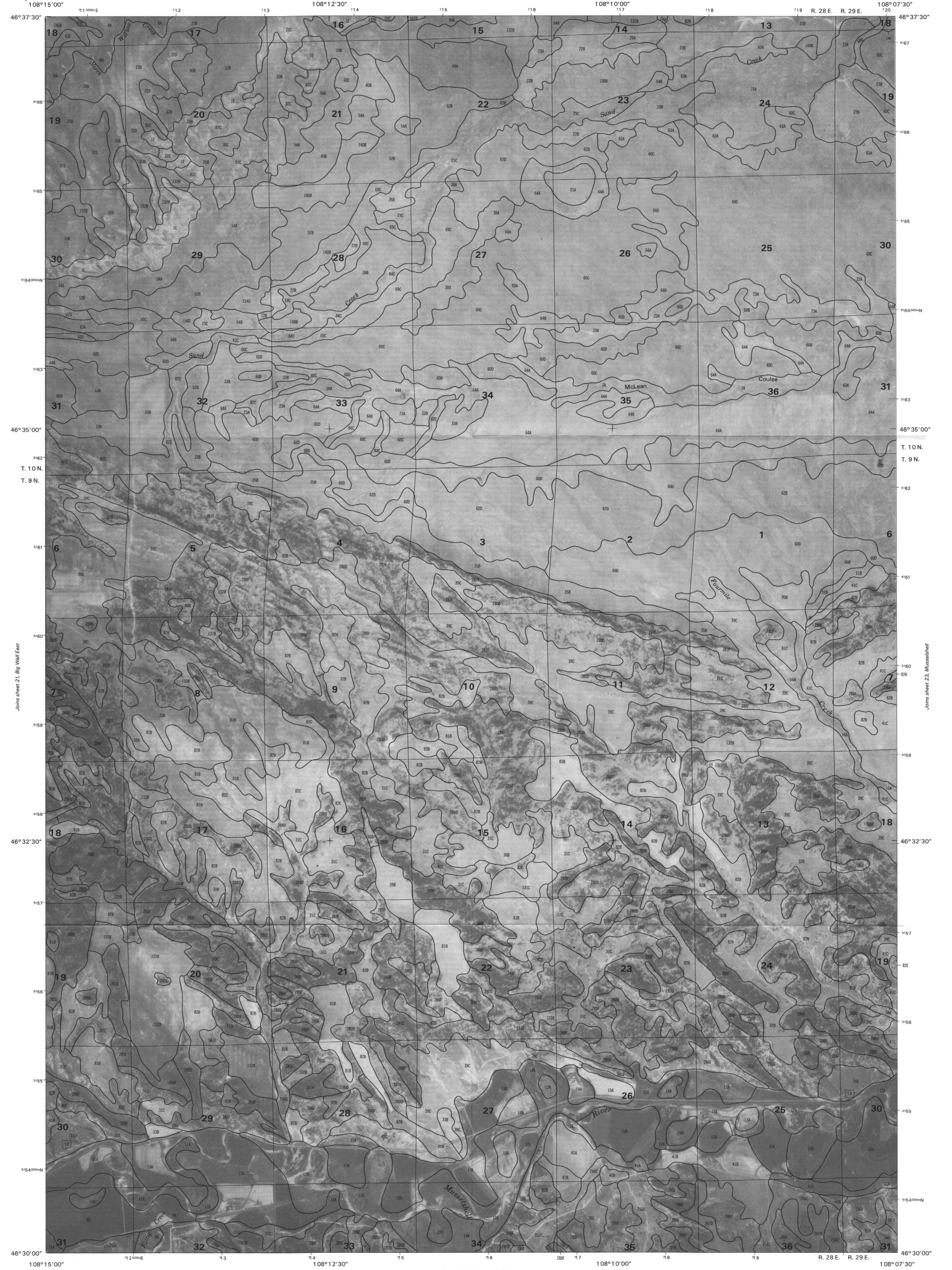

NORTH
SCALE 1:24000
KILOMETERS
1 0 1
FEET
1000 0 1000 2000 3000 4000 5000 6000 7000
MILES
1 0 1

QUADRANGLE LOCATION

BIG WALL EAST, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 21 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
DELPHIA QUADRANGLE
SHEET NUMBER 22 OF 48


Joins sheet 11, Jim Coulee
Joins sheet 12, Musselshell NW
Joins sheet 13, Akers Ranch
Joins sheet 21, Big Wall East
Joins sheet 23, Musselshell
Joins sheet 31, Gage NE
Joins sheet 32, Chimney Butte
Joins sheet 33, Corey Flat
108°15'00"
108°12'30"
108°10'00"
108°07'30"
46°37'30"
46°35'00"
46°32'30"
46°30'00"
T. 10 N.
T. 9 N.
R. 28 E.
R. 29 E.
North Willow Creek
Sand Creek
McLean Coulee
Fourmile Creek
Musselshell River
Fattig Creek
12

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

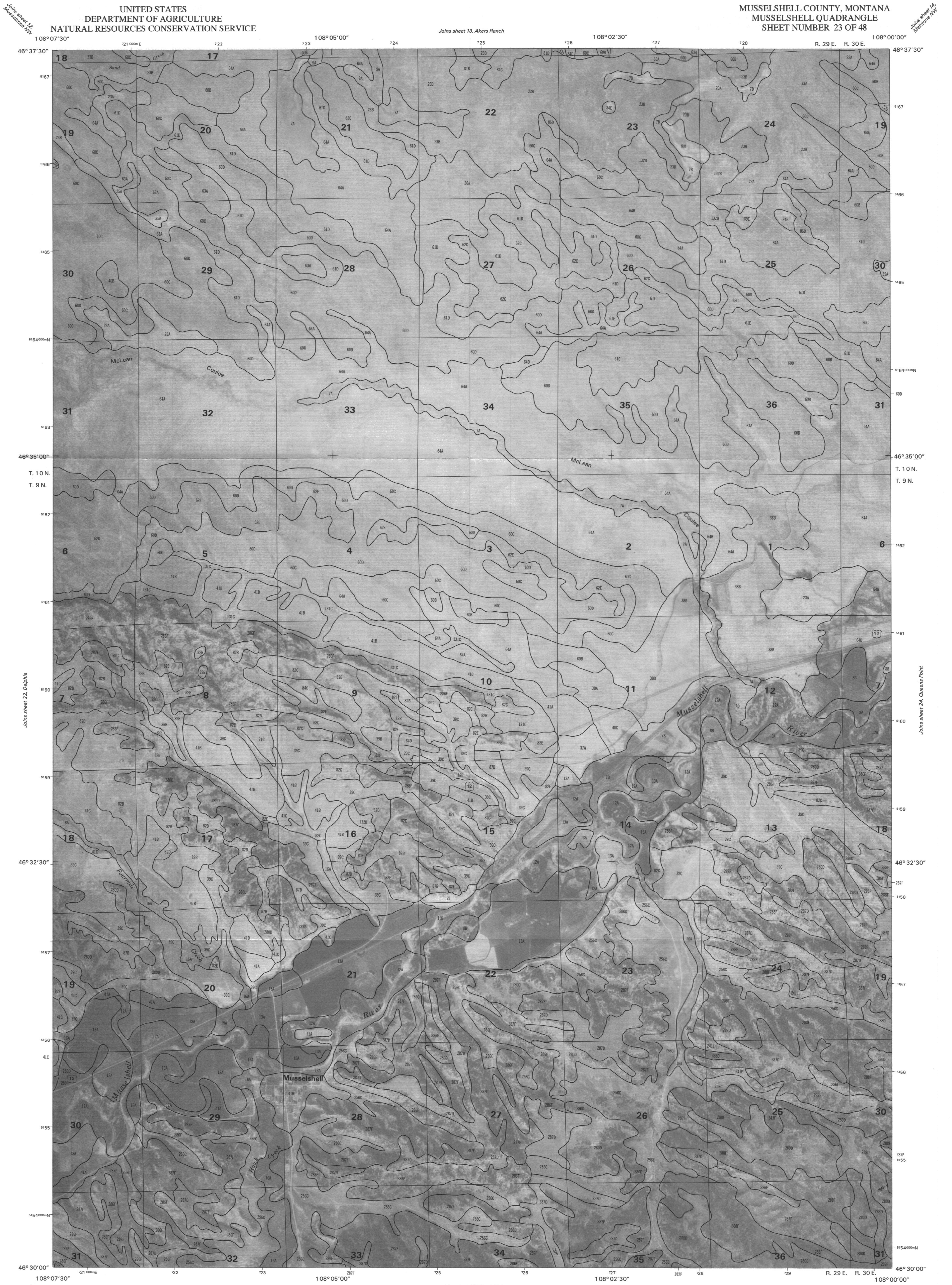
1 0 1
MILES

QUADRANGLE LOCATION

DELPHIA, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 22 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MUSSELSHELL QUADRANGLE
SHEET NUMBER 23 OF 48


Joins sheet 12, Musselshell NW
Joins sheet 13, Akers Ranch
Joins sheet 14, Melstone NW
Joins sheet 22, Delphia
Joins sheet 24, Queens Point
Joins sheet 32, Chimney Butte
Joins sheet 33, Corey Flat
Joins sheet 34, Chandler Spring
108°07′30″
108°05′00″
108°02′30″
108°00′00″
46°37′30″
46°35′00″
46°32′30″
46°30′00″
R. 29 E.
R. 30 E.
T. 10 N.
T. 9 N.
McLean Coulee
Musselshell River
Fourmile Creek
Hawk Creek
Sand Creek
Musselshell

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

SCALE 1:24000

KILOMETERS

FEET

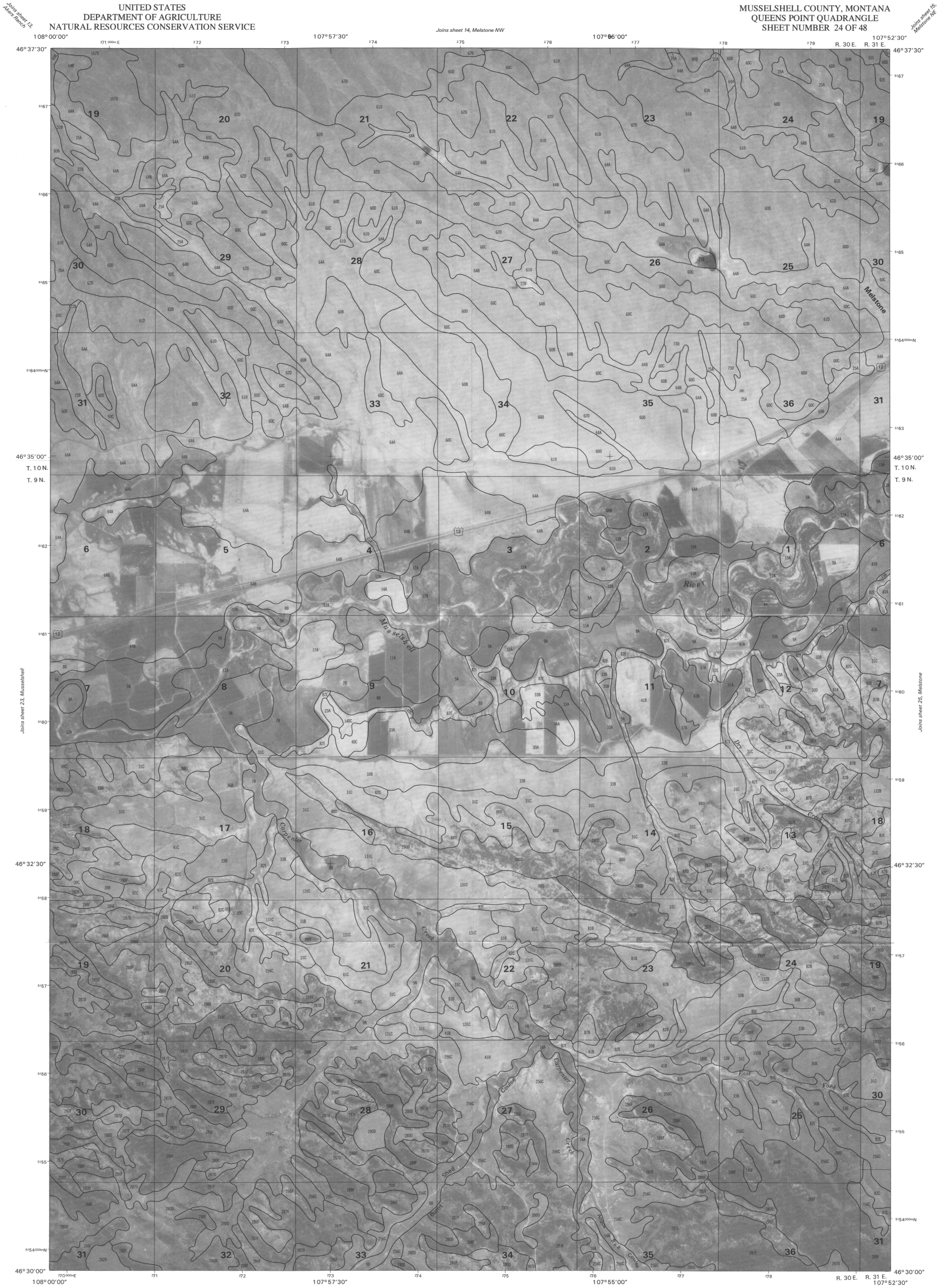
MILES

QUADRANGLE LOCATION

MUSSELSHELL, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 23 OF 48

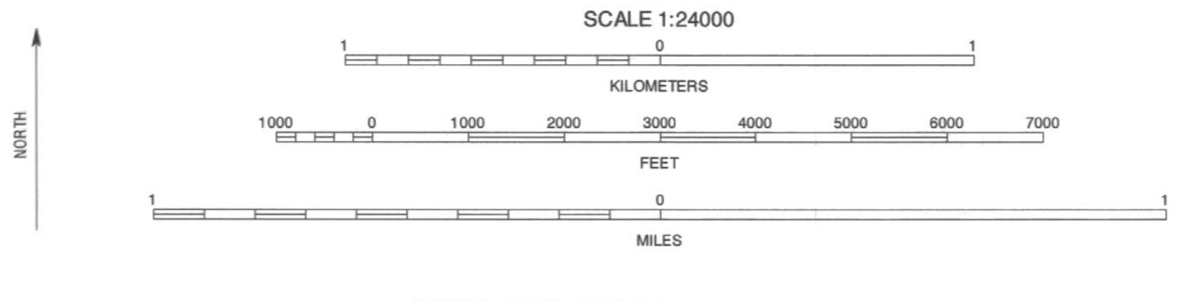
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
QUEENS POINT QUADRANGLE
SHEET NUMBER 24 OF 48


Joins sheet 13, Akers Ranch
Joins sheet 14, Melstone NW
Joins sheet 15, Melstone NE
Joins sheet 23, Musselshell
Joins sheet 25, Melstone
Joins sheet 33, Corey Flat
Joins sheet 34, Chandler Spring
Joins sheet 35, Weed Creek West
108°00′00″
107°57′30″
107°55′00″
107°52′30″
46°37′30″
46°35′00″
46°32′30″
46°30′00″
T. 10 N.
T. 9 N.
R. 30 E.
R. 31 E.
Melstone
Musselshell River
Carpenter Creek
Dry Creek
East Fork
Carpenter Creek
Shed Coulee
Coulee
Creek
12

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

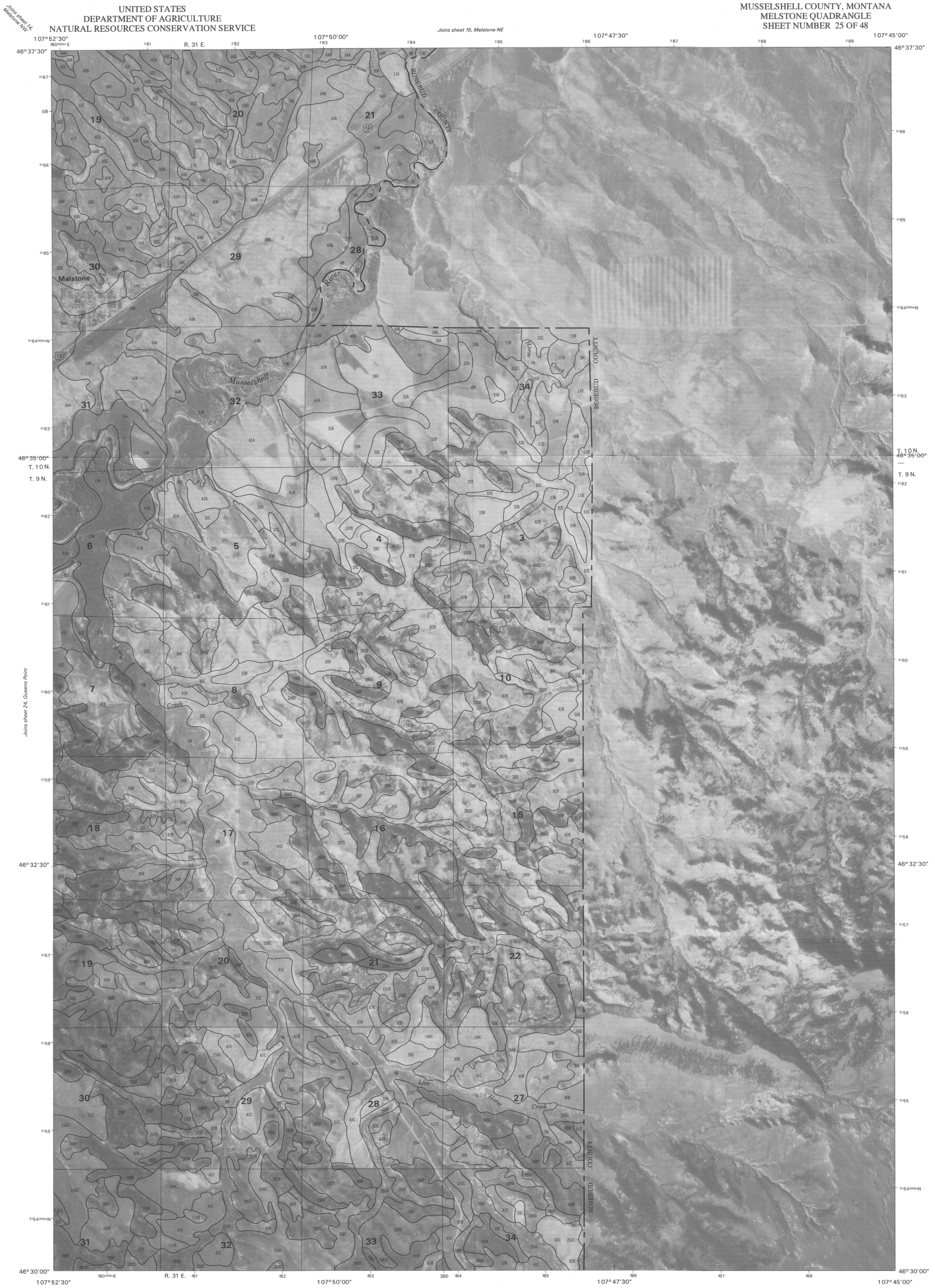

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

QUEENS POINT, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 24 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
MELSTONE QUADRANGLE
SHEET NUMBER 25 OF 48


Joins sheet 14, Melstone NW
Joins sheet 15, Melstone NE
Joins sheet 24, Queens Point
Joins sheet 34, Chandler Spring
Joins sheet 35, Weed Creek West
107°52'30"
107°50'00"
107°47'30"
107°45'00"
46°37'30"
46°35'00"
46°32'30"
46°30'00"
R. 31 E.
T. 10 N.
T. 9 N.
280000mE
5164000mN
5154000mN
Melstone
Musselshell
River
Lost Horse Creek
Horse Creek
ROSEBUD COUNTY
12
19
20
21
28
29
30
31
32
33
34
3
4
5
6
7
8
9
10
15
16
17
18
22
27

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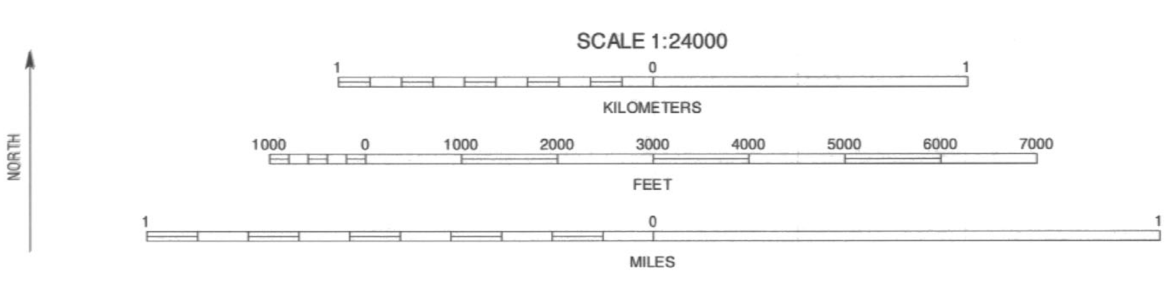
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 13.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

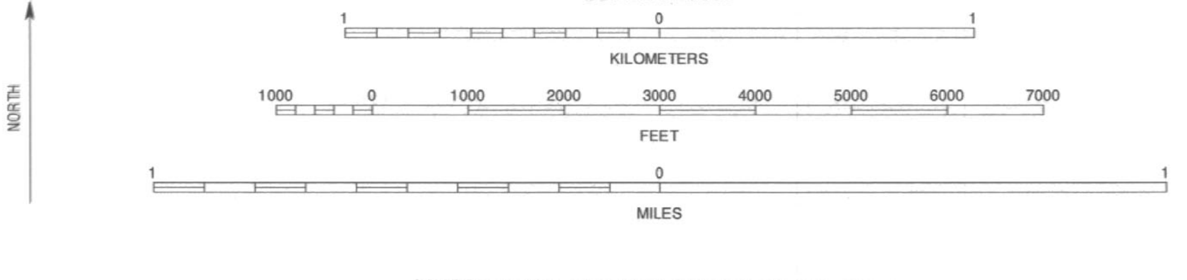
QUADRANGLE LOCATION

MELSTONE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 25 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
LAVINA NW QUADRANGLE
SHEET NUMBER 26 OF 48

Joins sheet 16, Emory School (oversize)
Joins sheet 17, Timber Buttes North
Joins sheet 27, Timber Buttes South
Joins sheet 36, Bundy
109°00'00"
108°57'30"
108°55'00"
108°52'30"
46°30'00"
46°27'30"
46°25'00"
46°22'30"
654000mE
655
656
657
658
659
660
661
662
663
5151
5150
5149
5148000mN
5147
5146
5145
5144
5143
5142
5141
5140
5139
5138000mN
R. 22 E.
R. 23 E.
T. 9 N.
T. 8 N
GOLDEN VALLEY COUNTY
36
31
5
8
152A
181E
82B
31C
82C
82E
36B
31B
32D
81B
56A
32B
83D


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

LAVINA NW, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 26 OF 48

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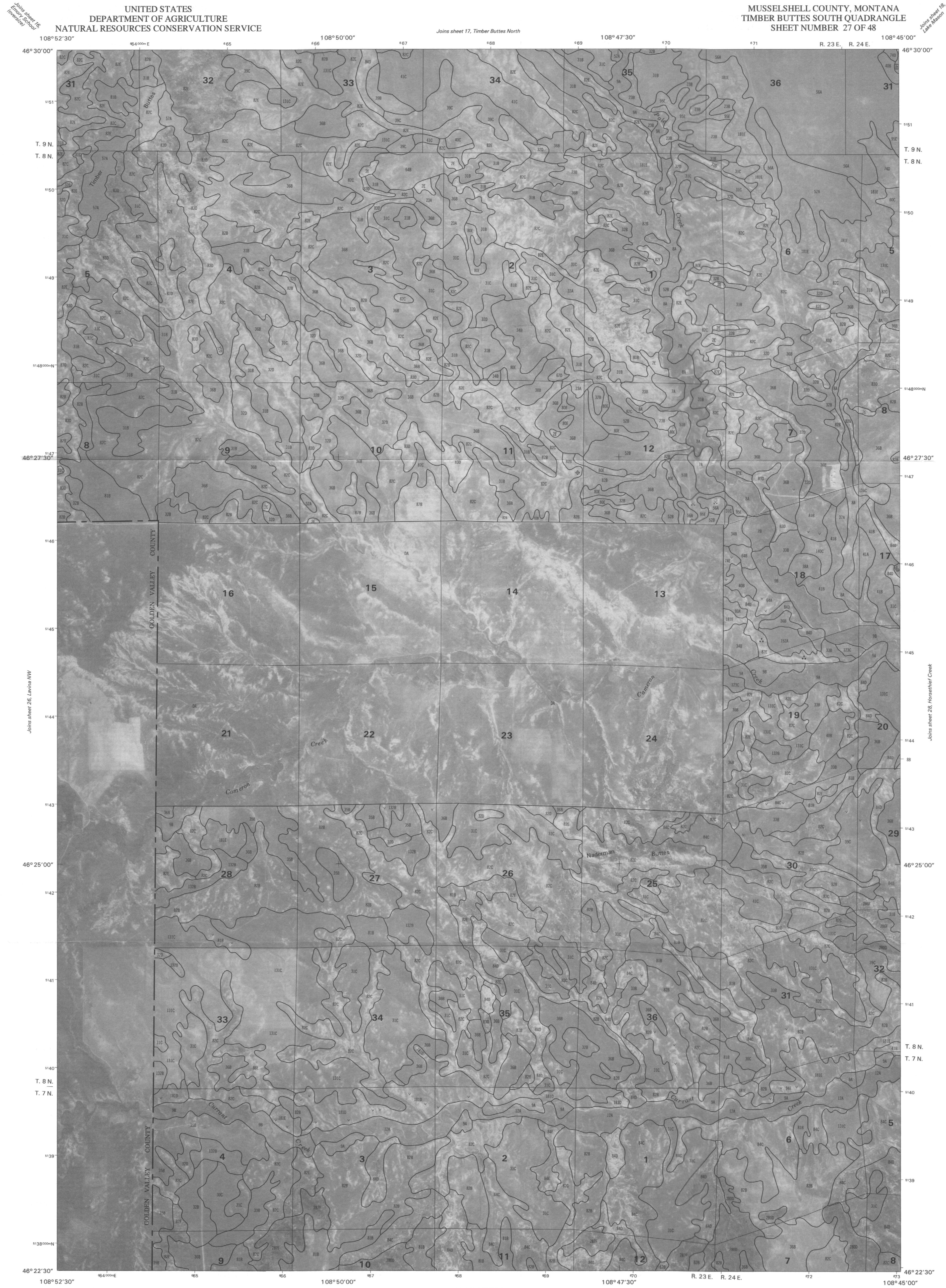
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

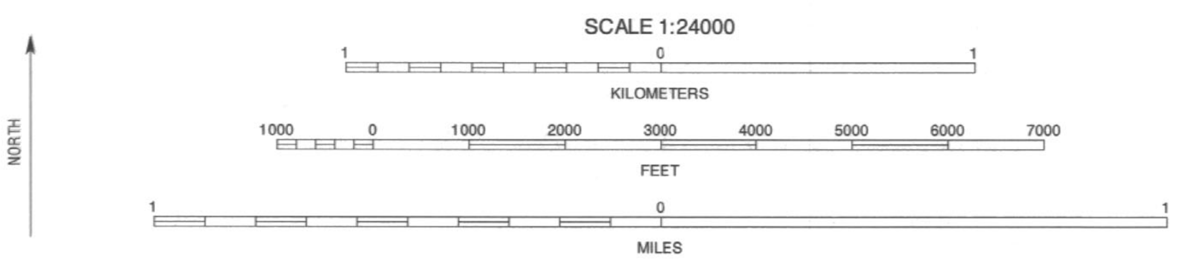
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
TIMBER BUTTES SOUTH QUADRANGLE
SHEET NUMBER 27 OF 48


Joins sheet 16, Emory School (oversize)
Joins sheet 17, Timber Buttes North
Joins sheet 18, Lake Mason
Joins sheet 26, Lavina NW
Joins sheet 28, Horsethief Creek
Joins sheet 36, Bundy
108° 52′30″
108° 50′00″
108° 47′30″
108° 45′00″
46° 30′00″
46° 27′30″
46° 25′00″
46° 22′30″
664000m E
665
666
667
668
669
670
671
672
673
5151
5150
5149
5148000m N
5147
5146
5145
5144
5143
5142
5141
5140
5139
5138000m N
R. 23 E.
R. 24 E.
T. 9 N.
T. 8 N.
T. 7 N.
31
32
33
34
35
36
5
4
3
2
1
6
8
9
10
11
12
7
16
15
14
13
17
18
21
22
23
24
19
20
28
27
26
25
30
29
33
34
35
36
31
32
4
3
2
1
6
5
9
10
11
12
7
8
Timber
Buttes
Pole
Creek
Cameron
Creek
Naderman
Buttes
Currant
Creek
GOLDEN VALLEY COUNTY
DA

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

TIMBER BUTTES SOUTH, MONTANA

7.5 MINUTE SERIES
SHEET NUMBER 27 OF 48

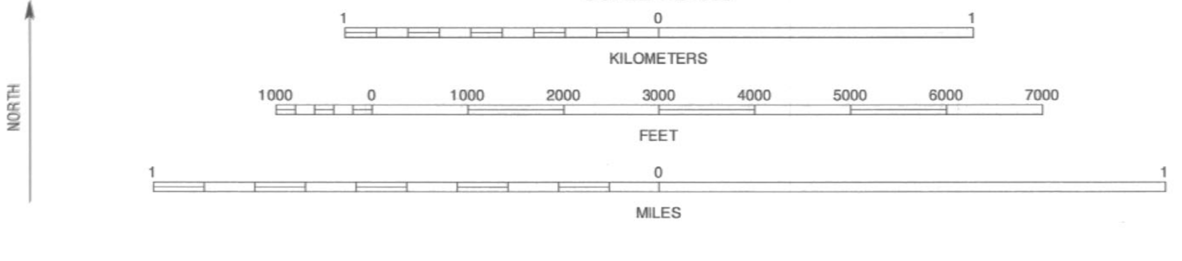
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
HORSETHIEF CREEK QUADRANGLE
SHEET NUMBER 28 OF 48

Joins sheet 17, Timber Buttes North
Joins sheet 18, Lake Mason
Joins sheet 19, Lake Mason SE
Joins sheet 27, Timber Buttes South
Joins sheet 29, Roundup
Joins sheet 36, Bundy
Joins sheet 37, Elso
Joins sheet 38, Harper Coulee
108° 45'00"
108° 42'30"
108° 40'00"
108° 37'30"
46° 30'00"
46° 27'30"
46° 25'00"
46° 22'30"
673000m E
674
675
676
677
678
679
680
681
682
674000m E
5152
5151
5150
5149000m N
5148000m N
5147
5146
5145
5144
5143
5142
5141
5140
5139
5139000m N
T. 9 N.
T. 8 N.
T. 7 N.
R. 24 E.
R. 25 E.
Horsethief Creek
Currant Creek
Alkali Creek
31
32
33
34
35
36
5
4
3
2
1
6
8
9
10
11
12
7
17
16
15
14
13
18
20
21
22
23
24
19
29
28
27
26
25
30
32
33
34
35
36
31
5
4
3
2
1
6
8
9
10
11
12
7

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

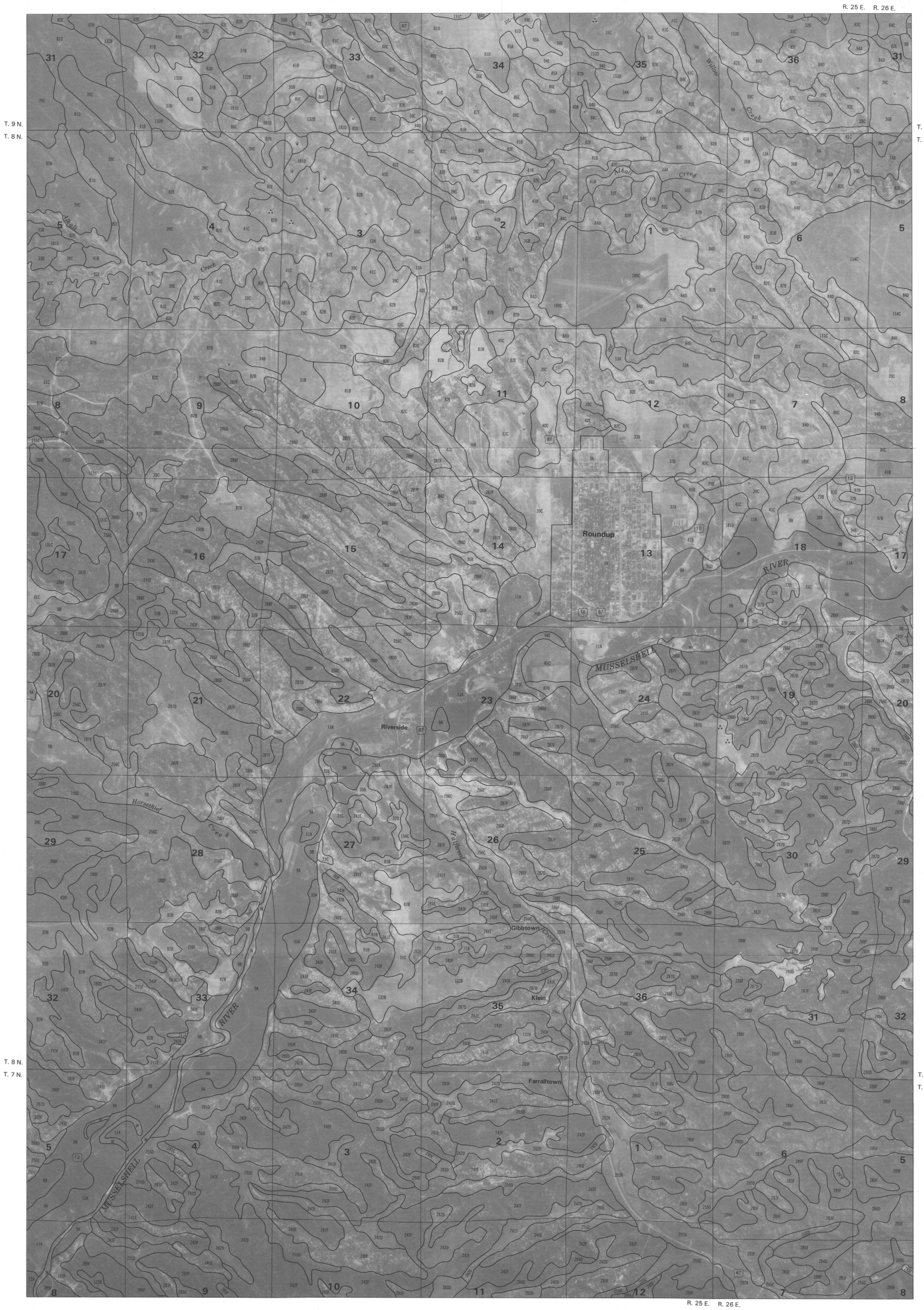
QUADRANGLE LOCATION

HORSETHIEF CREEK, MONTANA

7.5 MINUTE SERIES
SHEET NUMBER 28 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

ROUNDUP QUADRANGLE
SHEET NUMBER 29 OF 48


R. 25 E.
R. 26 E.
T. 9 N.
T. 8 N.
T. 7 N.
31
32
33
34
35
36
5
4
3
2
1
6
8
9
10
11
12
7
17
16
15
14
13
18
20
21
22
23
24
19
29
28
27
26
25
30
Willow Creek
Alkali Creek
Creek
Roundup
MUSSELSHELL RIVER
RIVER
Riverside
Horsethief Creek
Halfbreed Creek
Gibbtown
Klein
Farralltown
12
87

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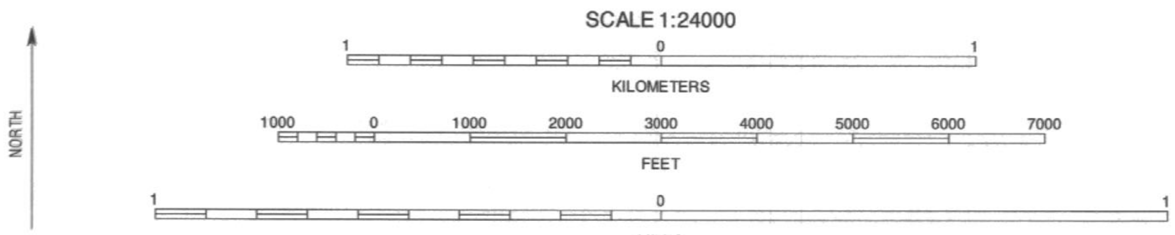
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

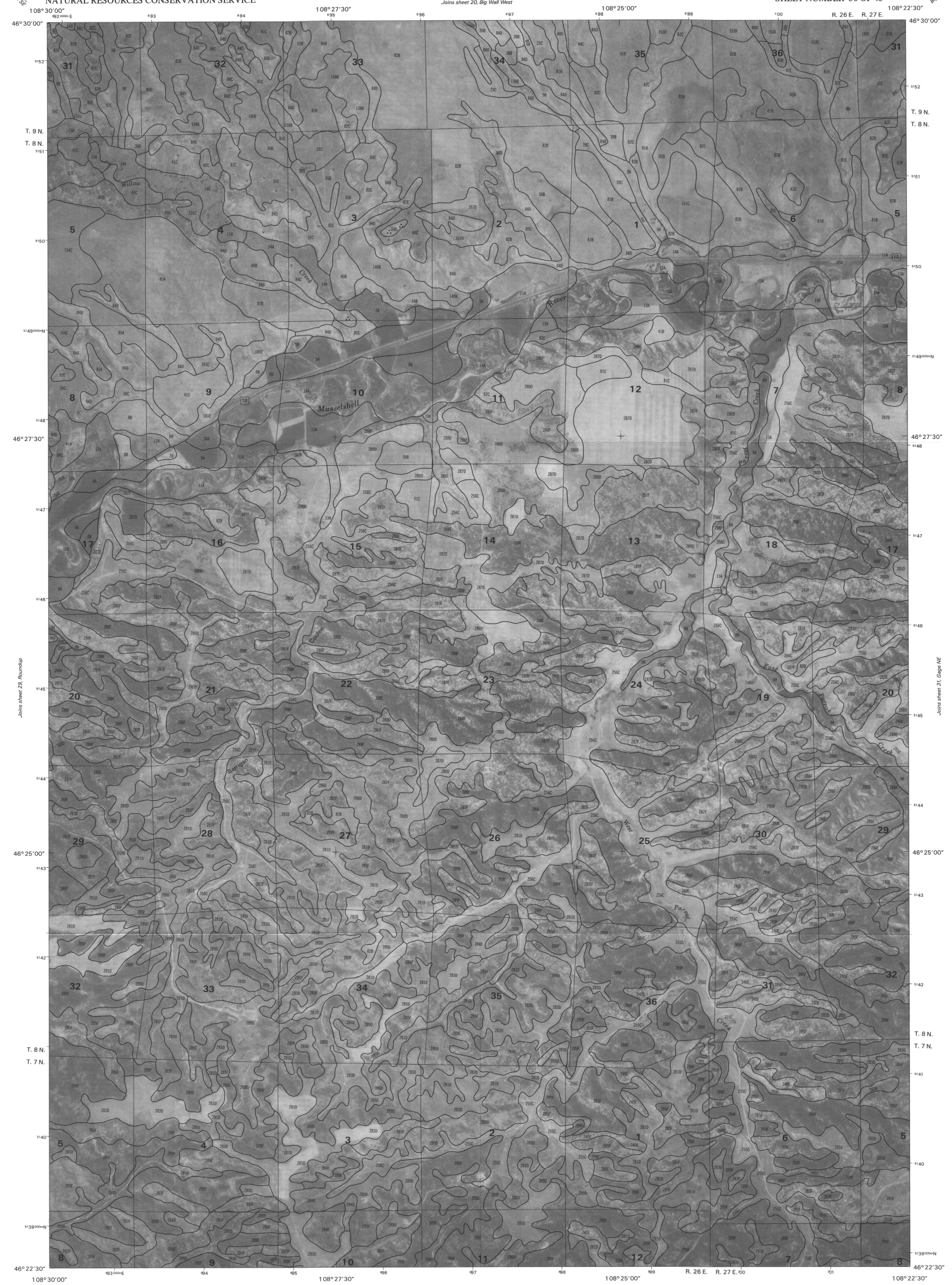
QUADRANGLE LOCATION

ROUNDUP, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 29 OF 48

MUSSELSHELL COUNTY, MONTANA NO. 29

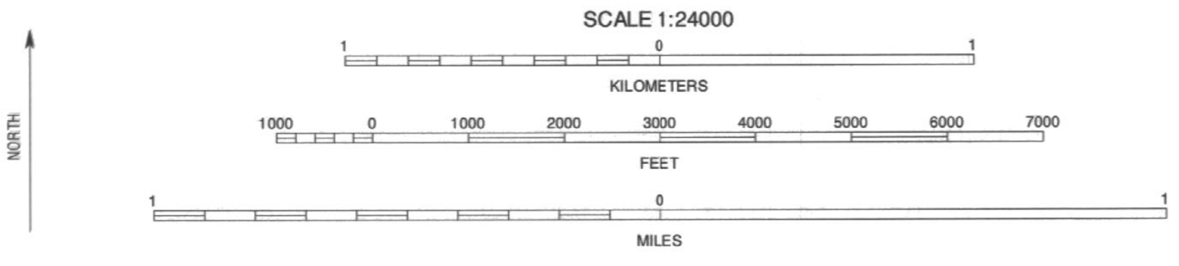
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
GAGE QUADRANGLE
SHEET NUMBER 30 OF 48


Joins sheet 19, Lake Mason SE
Joins sheet 20, Big Wall West
Joins sheet 21, Big Wall East
Joins sheet 29, Roundup
Joins sheet 31, Gage NE
Joins sheet 38, Harper Coulee
108° 30′00″
108° 27′30″
108° 25′00″
108° 22′30″
46° 30′00″
46° 27′30″
46° 25′00″
46° 22′30″
R. 26 E.
R. 27 E.
T. 9 N.
T. 8 N.
T. 7 N.
Willow Creek
Musselshell River
Parrot Creek
East Parrot Creek
West Parrot Creek
Coulee
Barrigan
12

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

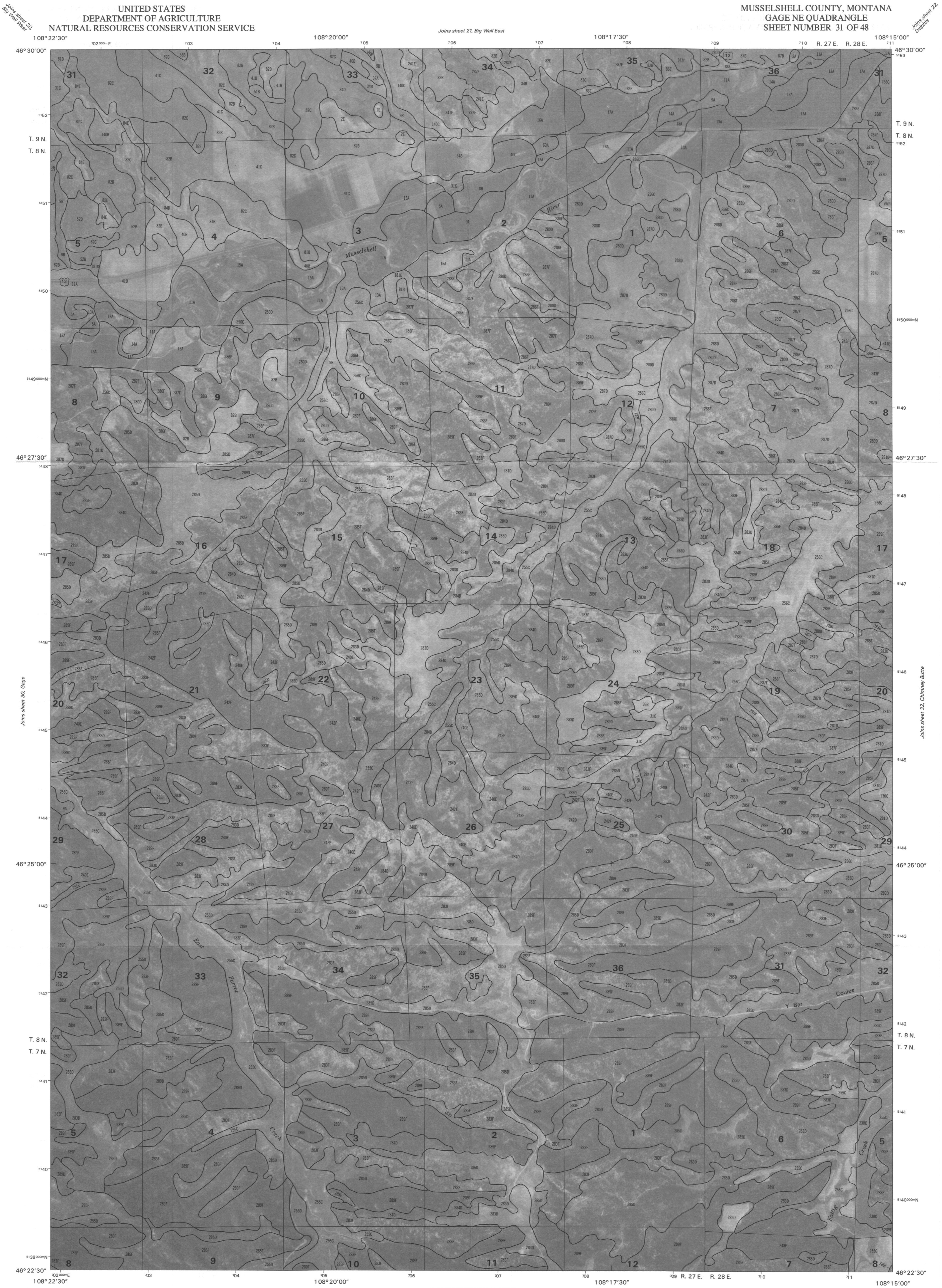

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

GAGE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 30 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
GAGE NE QUADRANGLE
SHEET NUMBER 31 OF 48


Joins sheet 20, Big Wall West
Joins sheet 21, Big Wall East
Joins sheet 22, Delphia
Joins sheet 30, Gage
Joins sheet 32, Chimney Butte
Joins sheet 39, Signal Mountain
Joins sheet 40, Dunn Mountain North
Joins sheet 41, Cherry Spring
108° 22′30″
108° 20′00″
108° 17′30″
108° 15′00″
46° 30′00″
46° 27′30″
46° 25′00″
46° 22′30″
702 000m E
703
704
705
706
707
708
709
710
711
5153
5152
5151
5150
5150 000m N
5149 000m N
5149
5148
5147
5146
5145
5144
5143
5142
5141
5140
5140 000m N
5139 000m N
R. 27 E.
R. 28 E.
T. 9 N.
T. 8 N.
T. 7 N.
Musselshell
River
East
Parrot
Creek
Y Bar
Coulee
Pattie
Creek
12
31
32
33
34
35
36
5
4
3
2
1
6
8
9
10
11
12
7
17
16
15
14
13
18
20
21
22
23
24
19
29
28
27
26
25
30

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

1 0 1
MILES

QUADRANGLE LOCATION

GAGE NE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 31 OF 48

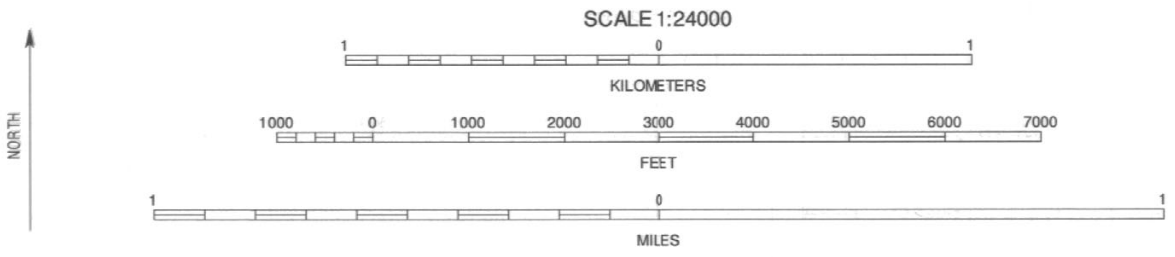
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
CHIMNEY BUTTE QUADRANGLE
SHEET NUMBER 32 OF 48

Joins sheet 21, Big Wall East
Joins sheet 22, Delphia
Joins sheet 23, Musselshell
108°15′00″
108°12′30″
108°10′00″
108°07′30″
46°30′00″
46°27′30″
46°25′00″
46°22′30″
712 000m E
713
714
715
716
717
718
719
720
721
5153
5152
5151
5150000m N
5149
5148
5147
5146
5145
5144
5143
5142
5141
5140000m N
T. 9 N.
T. 8 N.
T. 7 N.
R. 28 E.
R. 29 E.
Joins sheet 31, Gage NE
Joins sheet 33, Corey Flat
Fattig Creek
Flatwillow Creek
Y Bar Coulee
Carters Coulee
Joins sheet 40, Dunn Mountain North
Joins sheet 41, Cherry Spring
Joins sheet 42, Steamboat Butte

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

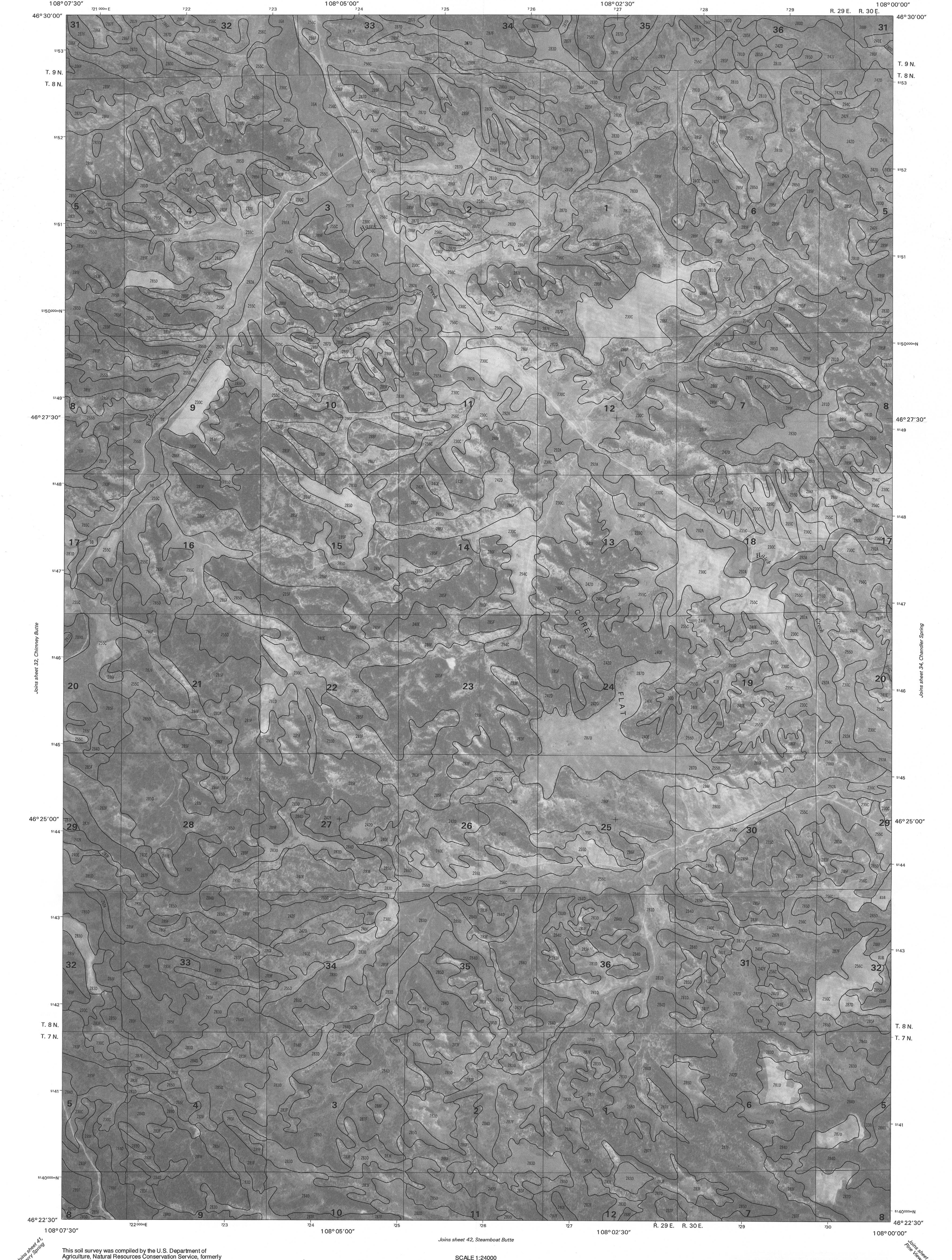

SCALE 1:24000
NORTH
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

CHIMNEY BUTTE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 32 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
COREY FLAT QUADRANGLE
SHEET NUMBER 33 OF 48


Joins sheet 22, Delphia
Joins sheet 23, Musselshell
Joins sheet 24, Queens Point
Joins sheet 32, Chimney Butte
Joins sheet 34, Chandler Spring
Joins sheet 41, Cherry Spring
Joins sheet 42, Steamboat Butte
Joins sheet 43, Pine View
108°07'30"
108°05'00"
108°02'30"
108°00'00"
46°30'00"
46°27'30"
46°25'00"
46°22'30"
T. 9 N.
T. 8 N.
T. 7 N.
R. 29 E.
R. 30 E.
Hawk Creek
Fishel Creek
COREY FLAT

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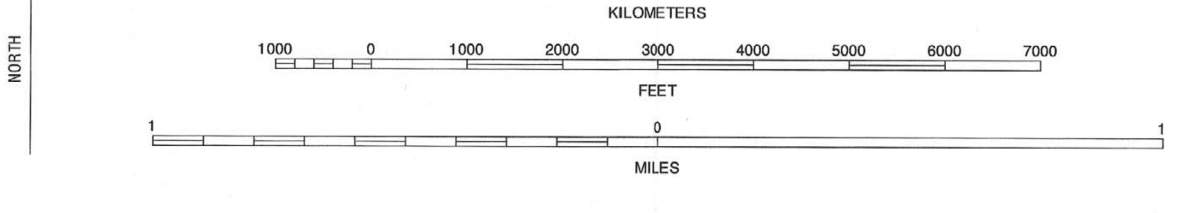
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

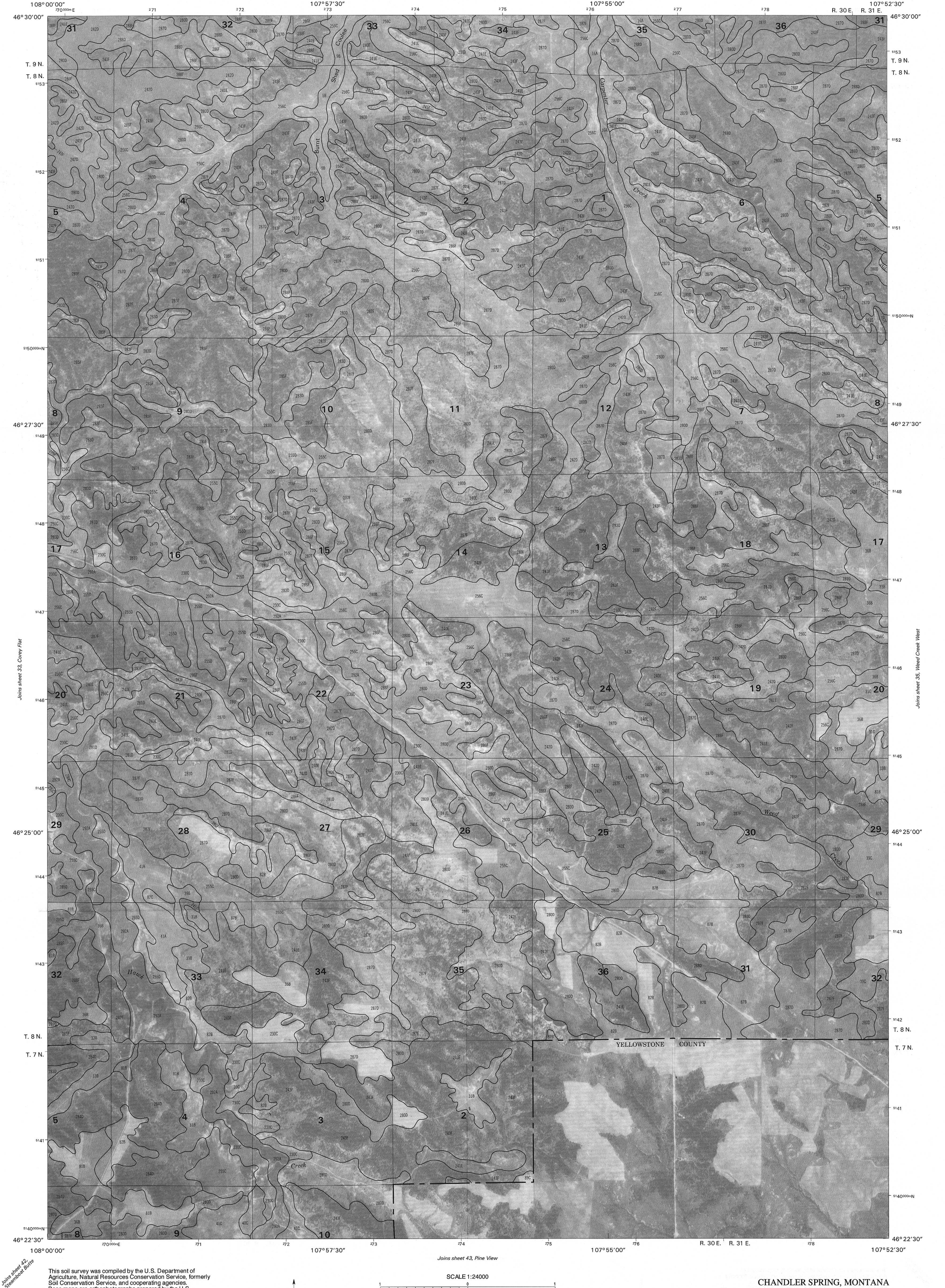

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

COREY FLAT, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 33 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
CHANDLER SPRING QUADRANGLE
SHEET NUMBER 34 OF 48



Joins sheet 23, Musselshell
Joins sheet 24, Queens Point
Joins sheet 25, Melstone
Joins sheet 33, Corey Flat
Joins sheet 35, Weed Creek West
Joins sheet 42, Steamboat Butte
Joins sheet 43, Pine View
108°00'00"
107°57'30"
107°55'00"
107°52'30"
46°30'00"
46°27'30"
46°25'00"
46°22'30"
T. 9 N.
T. 8 N.
T. 7 N.
R. 30 E.
R. 31 E.
Burnt Shed Coulee
Carpenter Creek
Weed Creek
Hawk Creek
YELLOWSTONE COUNTY

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

SCALE 1:24000

KILOMETERS

FEET

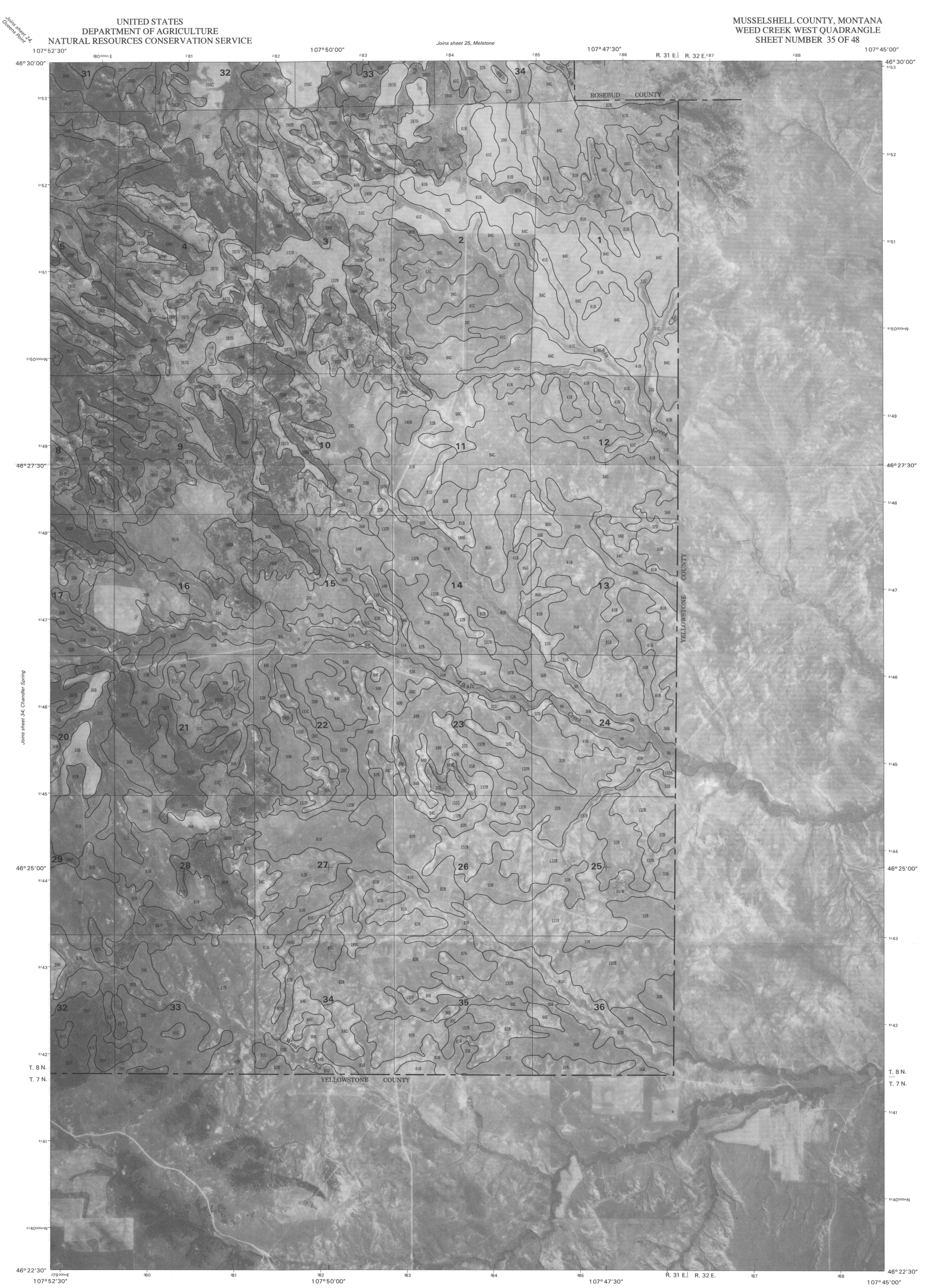
MILES

CHANDLER SPRING, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 34 OF 48

QUADRANGLE LOCATION

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
WEED CREEK WEST QUADRANGLE
SHEET NUMBER 35 OF 48


Joins sheet 24, Queens Point
Joins sheet 25, Melstone
Joins sheet 34, Chandler Spring
Joins sheet 42, Pine View
107°52'30"
107°50'00"
107°47'30"
107°45'00"
46°30'00"
46°27'30"
46°25'00"
46°22'30"
R. 31 E.
R. 32 E.
T. 8 N.
T. 7 N.
ROSEBUD COUNTY
YELLOWSTONE COUNTY
Cabin Creek
Alkali Creek
West Creek
31
32
33
34
1
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11
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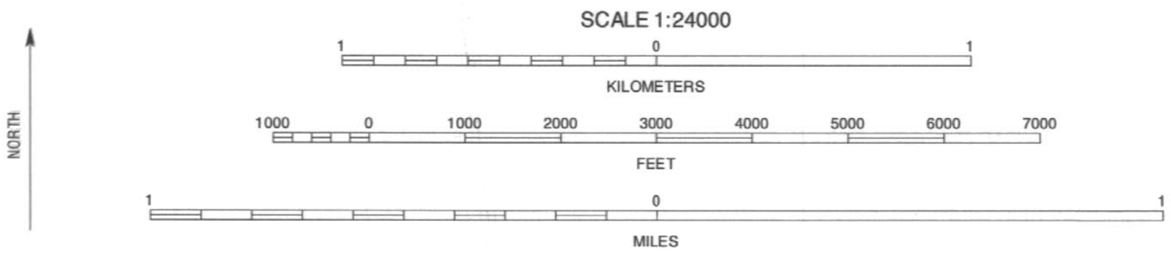
35
36

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

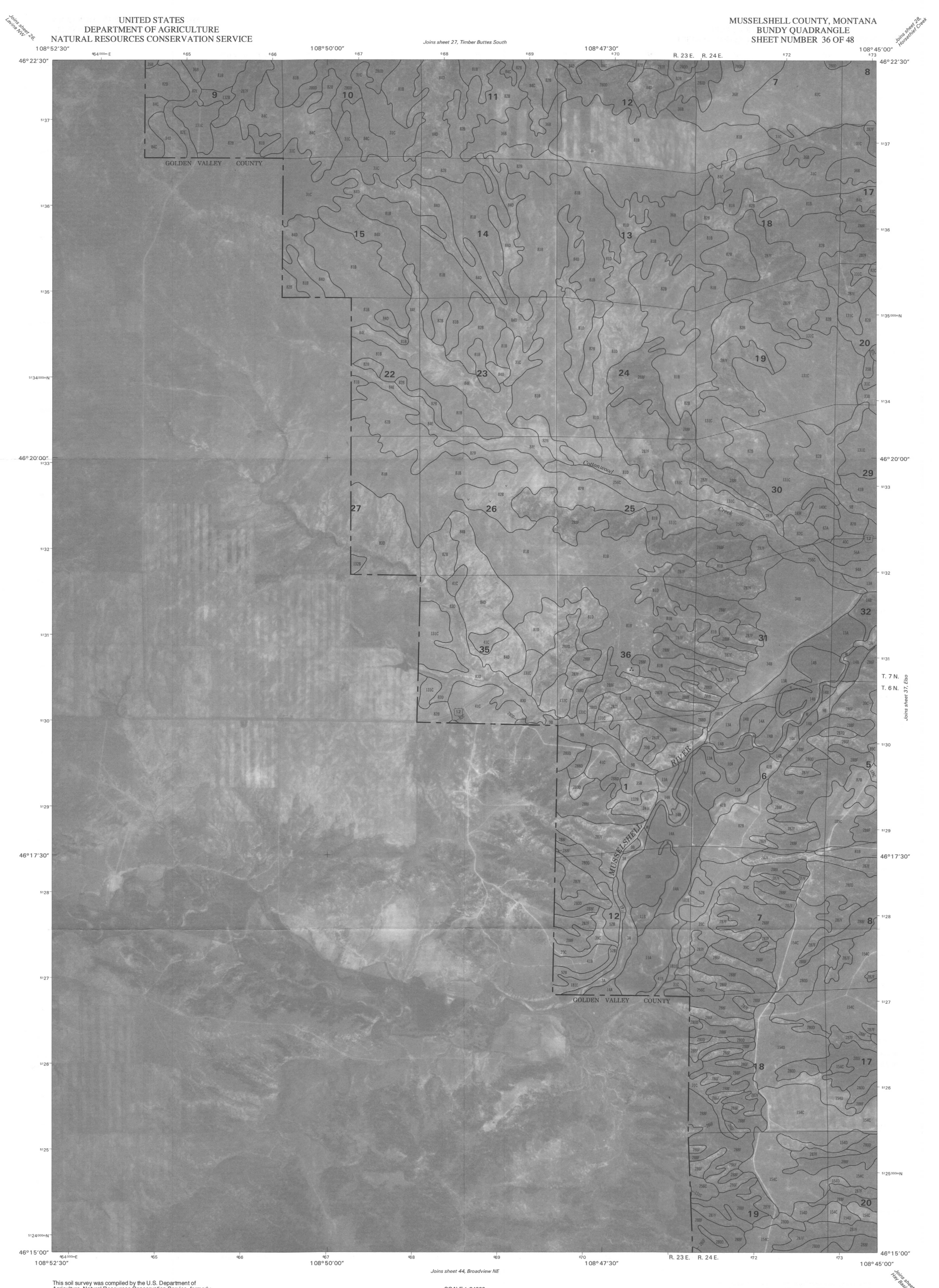

SCALE 1:24000
KILOMETERS
FEET
MILES
NORTH
1000
0
1000
2000
3000
4000
5000
6000
7000

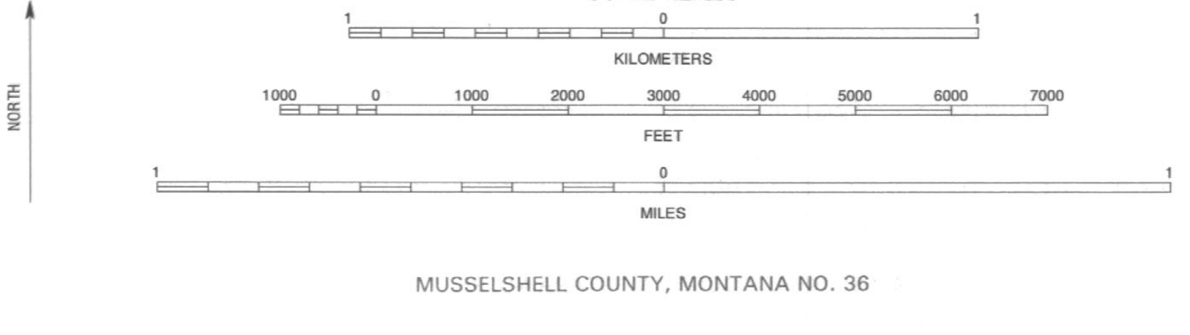
QUADRANGLE LOCATION

WEED CREEK WEST, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 35 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
BUNDY QUADRANGLE
SHEET NUMBER 36 OF 48


Joins sheet 26, Lavina NW
Joins sheet 27, Timber Buttes South
Joins sheet 28, Horsethief Creek
Joins sheet 37, Elso
Joins sheet 44, Broadview NE
Joins sheet 45, Hay Basin North
108°52'30"
108°50'00"
108°47'30"
108°45'00"
46°22'30"
46°20'00"
46°17'30"
46°15'00"
664000mE
665
666
667
668
669
670
672
673
5137
5136
5135
5135000mN
5134000mN
5134
5133
5132
5131
5130
5129
5128
5127
5126
5125
5125000mN
5124000mN
R. 23 E.
R. 24 E.
T. 7 N.
T. 6 N.
GOLDEN VALLEY COUNTY
Cottonwood
Creek
MUSSELSHELL
RIVER
12
7
8
9
10
11
12
13
14
15
17
18
19
20
22
23
24
25
26
27
29
30
31
32
35
36
1
5
6
7
8
12
17
18
19
20


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

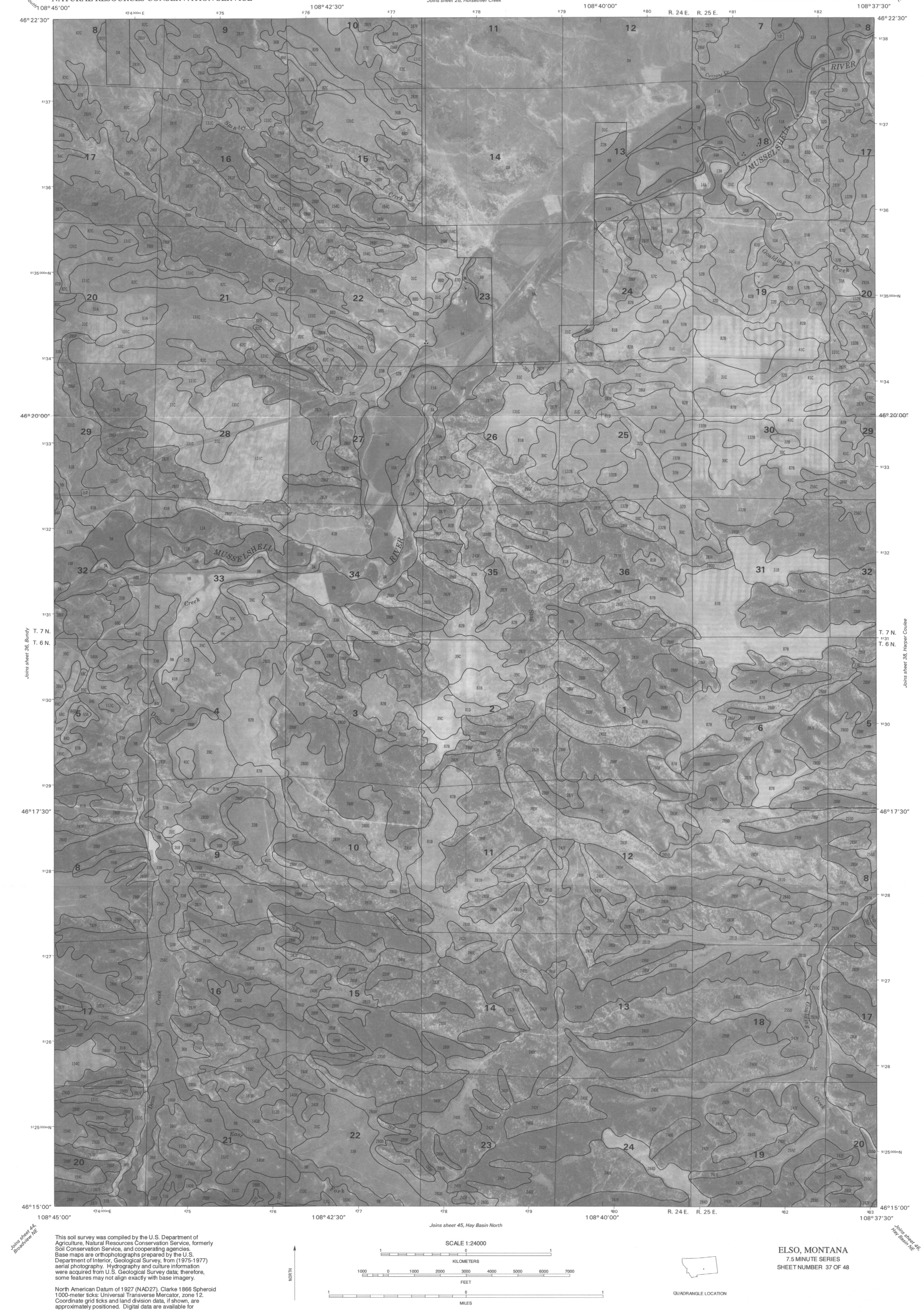
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

BUNDY, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 36 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
ELSO QUADRANGLE
SHEET NUMBER 37 OF 48


Joins sheet 27, Timber Buttes South
Joins sheet 28, Horsethief Creek
Joins sheet 29, Roundup
Joins sheet 36, Bundy
Joins sheet 38, Harper Coulee
Joins sheet 44, Broadview NE
Joins sheet 45, Hay Basin North
Joins sheet 46, Hay Basin NE
108° 45'00"
108° 42'30"
108° 40'00"
108° 37'30"
46° 22'30"
46° 20'00"
46° 17'30"
46° 15'00"
674000m E
675
676
677
678
679
680
681
682
683
5138
5137
5136
5135000m N
5134
5133
5132
5131
5130
5129
5128
5127
5126
5125000m N
R. 24 E.
R. 25 E.
T. 7 N.
T. 6 N.
MUSSELSHELL
RIVER
Currant Cr.
Goulding Creek
Stucky Cr.
Dean Creek
East Fork
Run
Slaughter Creek

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North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

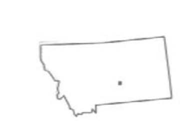
NORTH

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

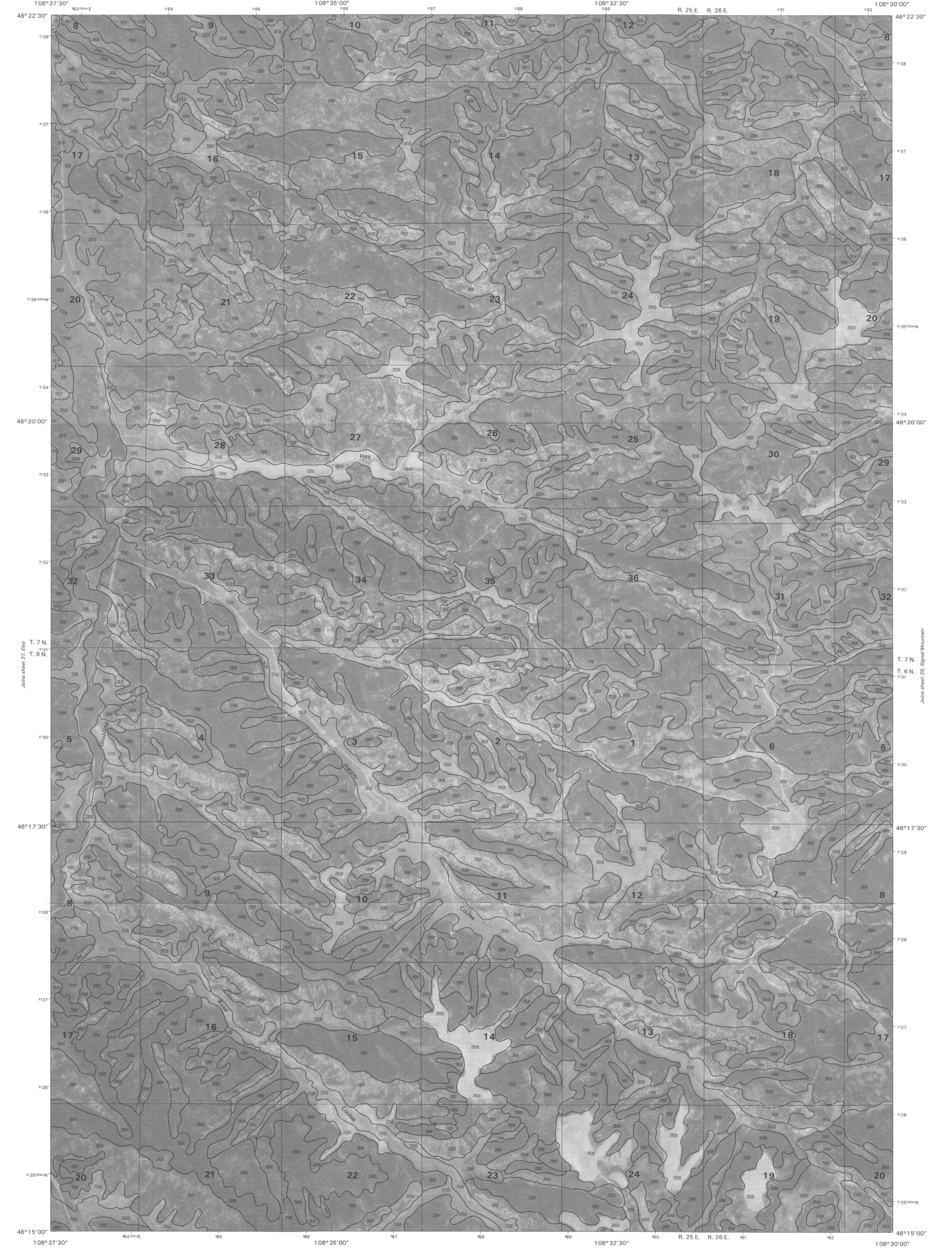
1 0 1
MILES


QUADRANGLE LOCATION

ELSO, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 37 OF 48

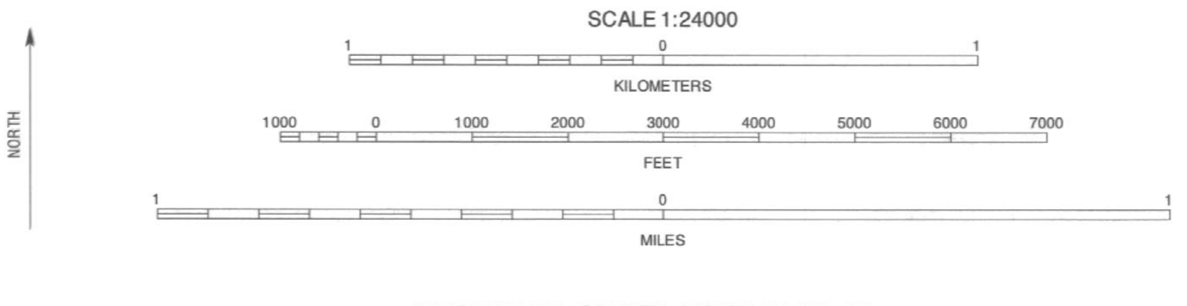
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
HARPER COULEE QUADRANGLE
SHEET NUMBER 38 OF 48


Joins sheet 28, Horsethief Creek
Joins sheet 29, Roundup
Joins sheet 30, Gage
Joins sheet 37, Elso
Joins sheet 39, Signal Mountain
Joins sheet 45, Hay Basin North
Joins sheet 46, Hay Basin NE
Joins sheet 47, Park Coulee
108°37'30"
108°35'00"
108°32'30"
108°30'00"
46°22'30"
46°20'00"
46°17'30"
46°15'00"
583000m E
584
585
586
587
588
589
590
591
592
5138
5137
5136
5135000m N
5134
5133
5132
5131
5130
5129
5128
5127
5126
5125000m N
R. 25 E.
R. 26 E.
T. 7 N.
T. 6 N.
Hay
Coulee
Harper
Coulee
Halfbreed
Creek
Road
Creek
Goulding

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

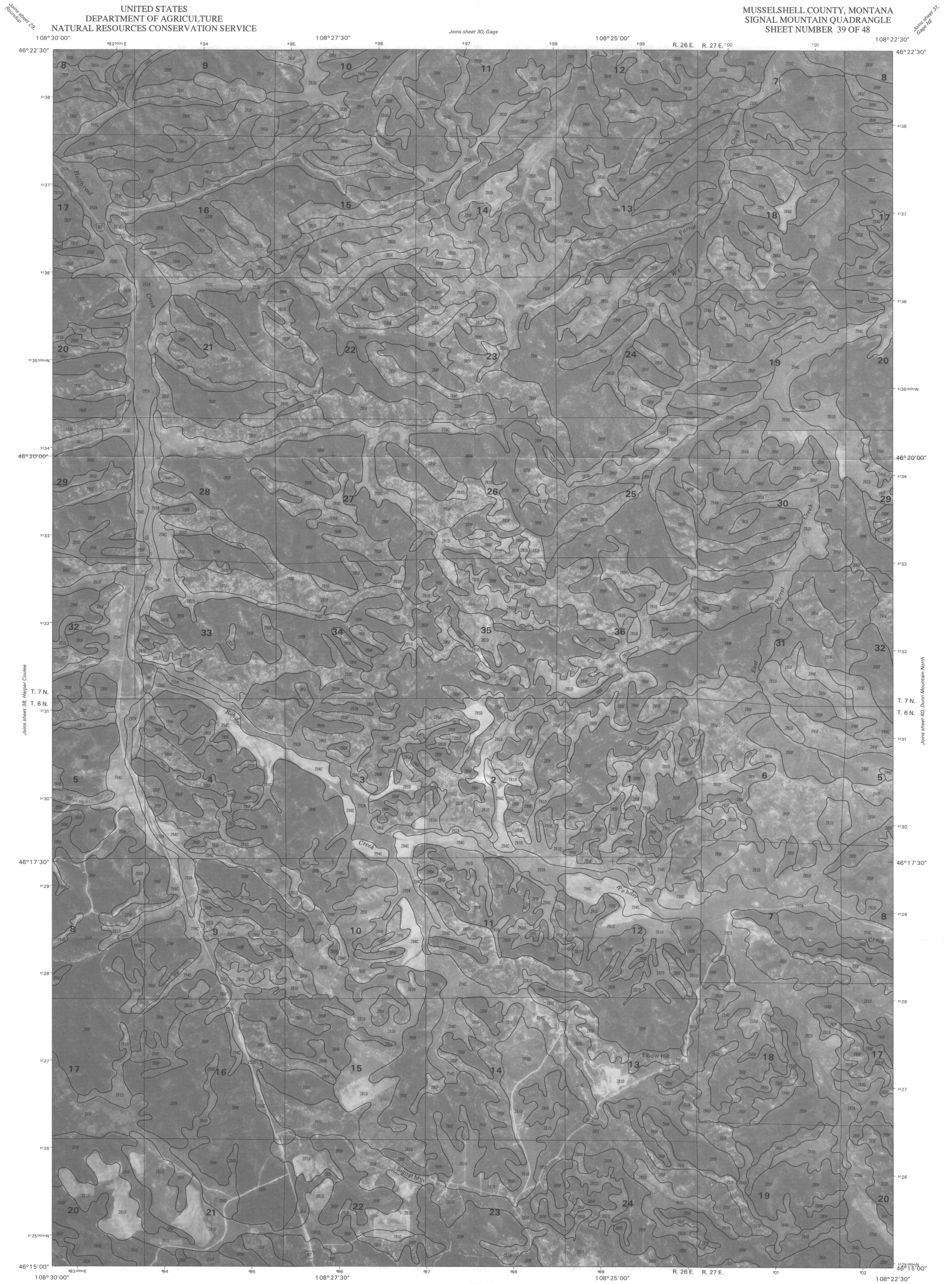

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

HARPER COULEE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 38 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
SIGNAL MOUNTAIN QUADRANGLE
SHEET NUMBER 39 OF 48


Joins sheet 29, Roundup
Joins sheet 30, Gage
Joins sheet 31, Gage NE
Joins sheet 38, Harper Coulee
Joins sheet 40, Dunn Mountain North
Joins sheet 46, Hay Basin NE
Joins sheet 47, Park Coulee
Joins sheet 48, Dunn Mountain South
108° 30'00"
108° 27'30"
108° 25'00"
108° 22'30"
46° 22'30"
46° 20'00"
46° 17'30"
46° 15'00"
693 000m E
694
695
696
697
698
699
700
701
702
5138
5137
5136
5135 000m N
5134
5133
5132
5131
5130
5129
5128
5127
5126
5125 000m N
R. 26 E.
R. 27 E.
T. 7 N.
T. 6 N.
Halfbreed Creek
West Parrot Creek
East Parrot Creek
Rehder Creek
Elbow Hill
Signal Mtn
87

SCALE 1:24000
KILOMETERS
FEET
MILES
NORTH
QUADRANGLE LOCATION

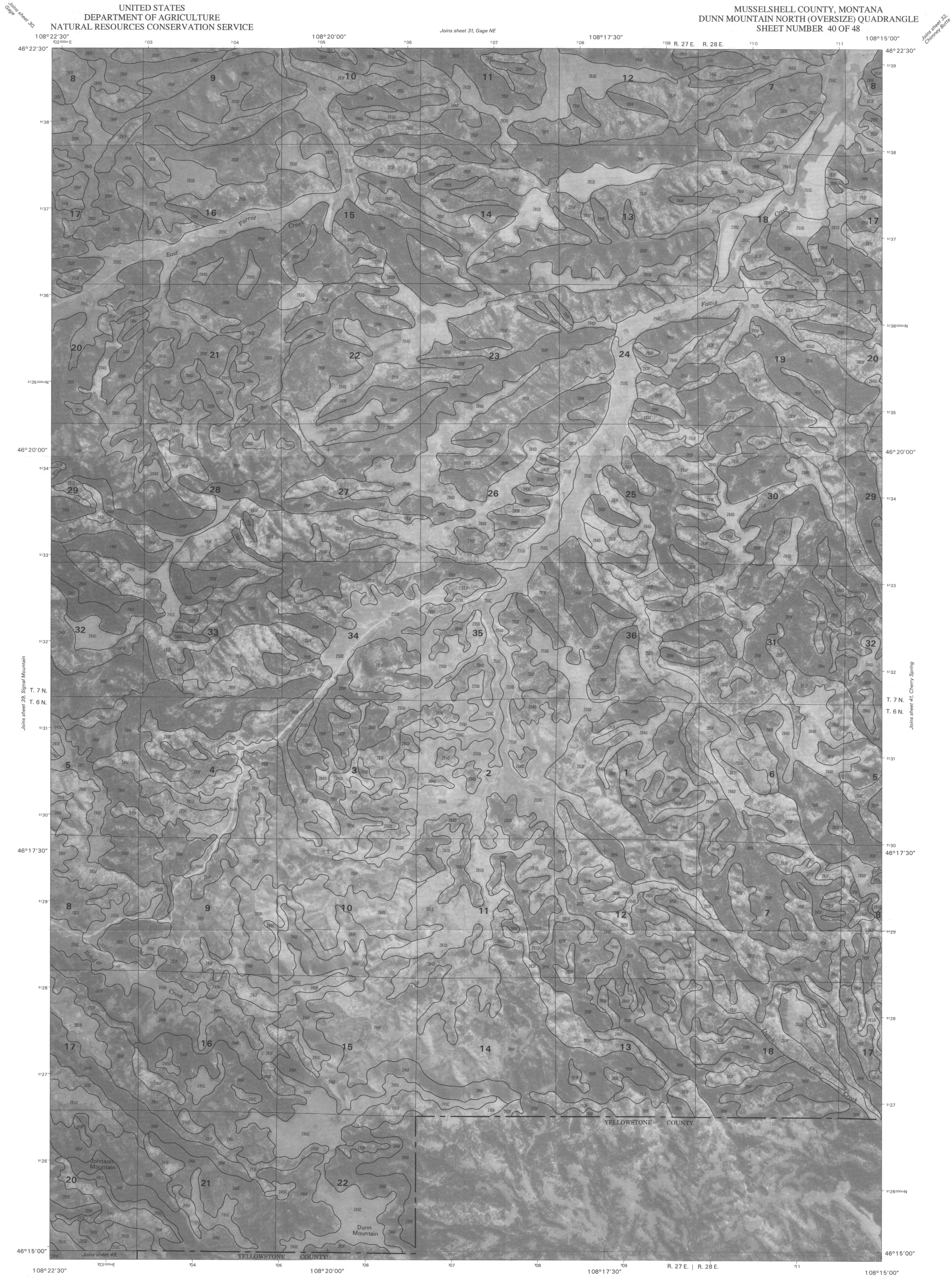
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

SIGNAL MOUNTAIN, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 39 OF 48

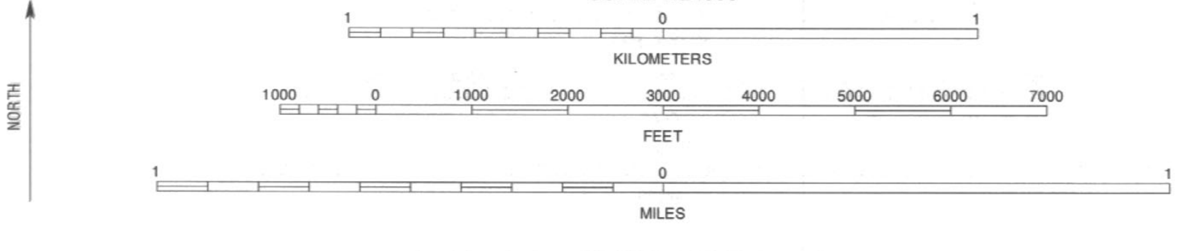
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
DUNN MOUNTAIN NORTH (OVERSIZE) QUADRANGLE
SHEET NUMBER 40 OF 48


Joins sheet 30, Gage
Joins sheet 31, Gage NE
Joins sheet 32, Chimney Butte
Joins sheet 39, Signal Mountain
Joins sheet 41, Cherry Spring
Joins sheet 47, Park Coulee
Joins sheet 48,
108° 22'30"
108° 20'00"
108° 17'30"
108° 15'00"
46° 22'30"
46° 20'00"
46° 17'30"
46° 15'00"
702 000m E
703 000m E
5136 000m N
5135 000m N
5126 000m N
R. 27 E.
R. 28 E.
T. 7 N.
T. 6 N.
East Parrot Creek
Fattig
Creek
Rabbit Creek
Duck Creek
Johnson Mountain
Dunn Mountain
YELLOWSTONE COUNTY
245C
246F
255C
255D
281D
283F
284D
285D
285F
289F
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

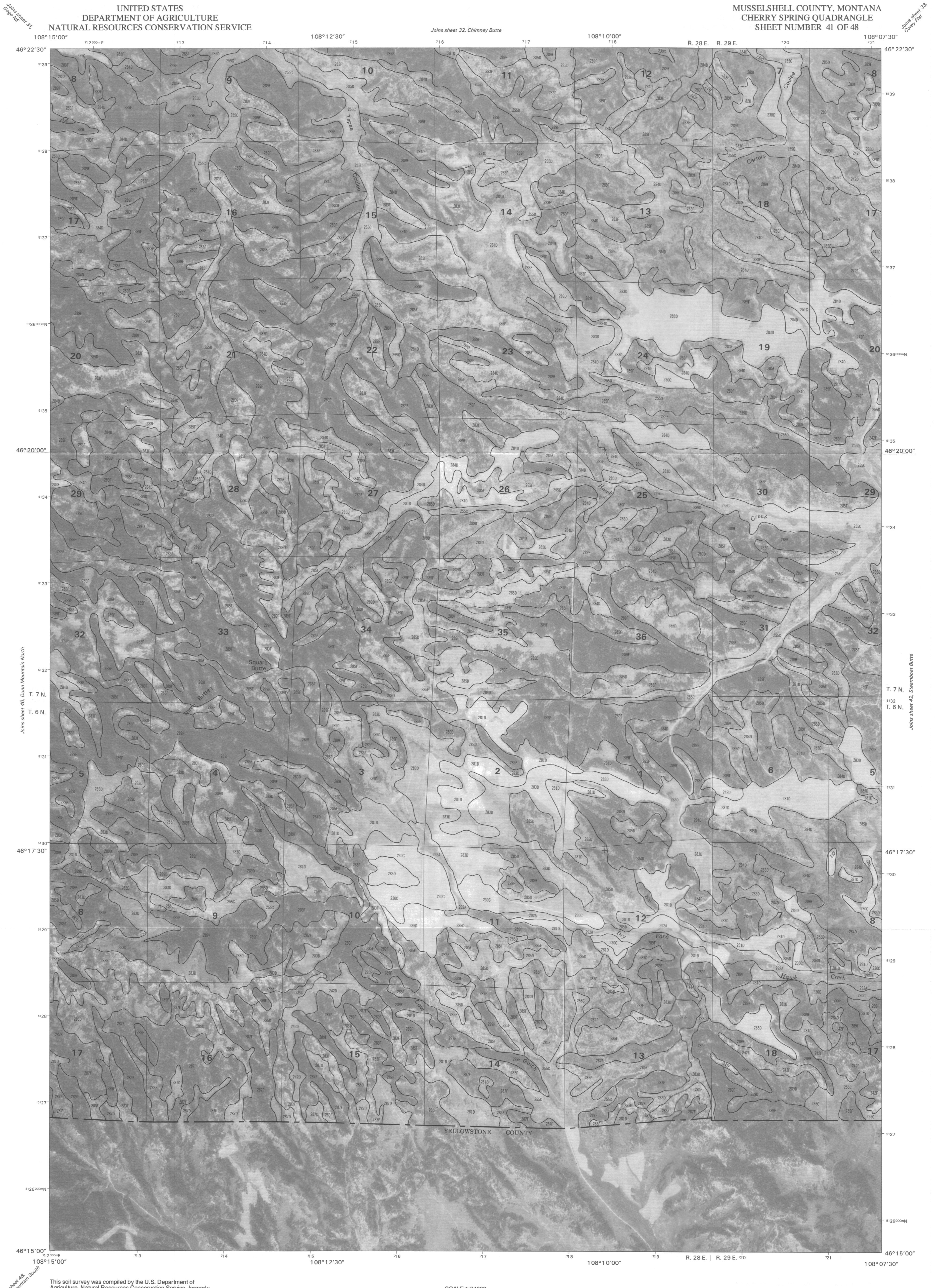
MUSSELSHELL COUNTY, MONTANA NO. 40

DUNN MOUNTAIN NORTH (OVERSIZE), MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 40 OF 48

QUADRANGLE LOCATION

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
CHERRY SPRING QUADRANGLE
SHEET NUMBER 41 OF 48


Joins sheet 31, Gage NE
Joins sheet 32, Chimney Butte
Joins sheet 33, Corey Flat
Joins sheet 40, Dunn Mountain North
Joins sheet 42, Steamboat Butte
Joins sheet 48, Dunn Mountain South
108°15'00"
108°12'30"
108°10'00"
108°07'30"
46°22'30"
46°20'00"
46°17'30"
46°15'00"
712 000m E
713
714
715
716
717
718
719
720
721
5139
5138
5137
5136 000m N
5135
5134
5133
5132
5131
5130
5129
5128
5127
5126 000m N
R. 28 E.
R. 29 E.
T. 7 N.
T. 6 N.
Tenne Coulee
Coulee
Carters
Hawk Creek
Square Butte
Buttes
Dry Fork
Gulch
YELLOWSTONE COUNTY
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
230C
242D
255C
281D
283D
283F
284D
285D
287D
289F
292A

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

SCALE 1:24000

1 0 1
KILOMETERS

1000 0 1000 2000 3000 4000 5000 6000 7000
FEET

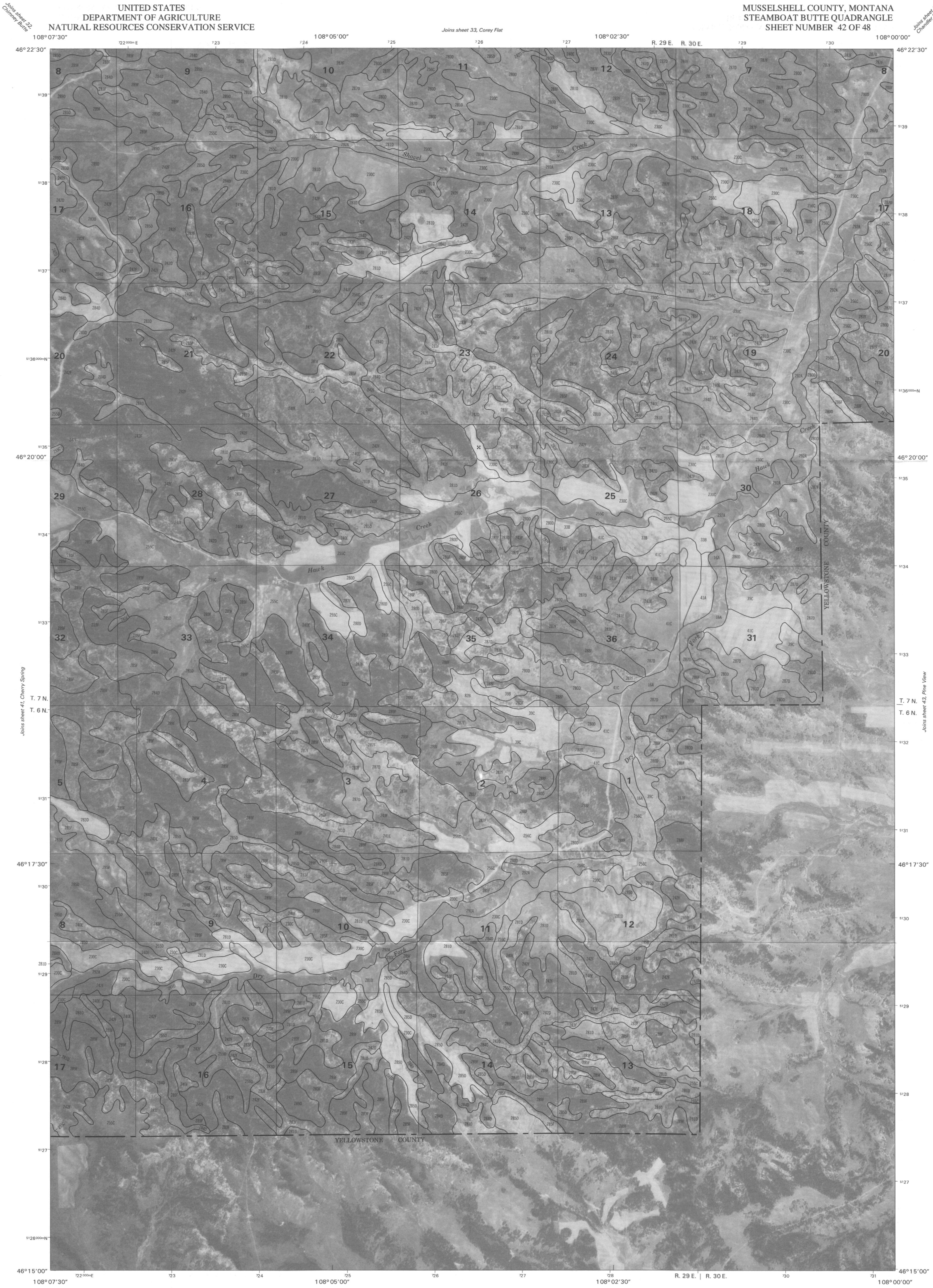
1 0 1
MILES

QUADRANGLE LOCATION

CHERRY SPRING, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 41 OF 48

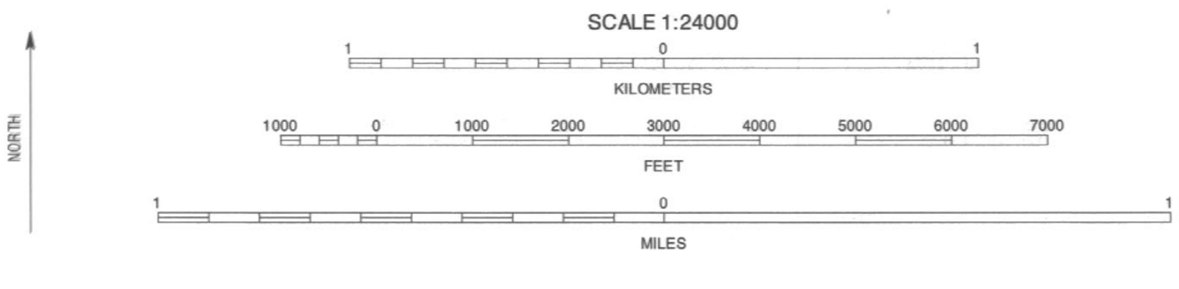
UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
STEAMBOAT BUTTE QUADRANGLE
SHEET NUMBER 42 OF 48


Joins sheet 32, Chimney Butte
Joins sheet 33, Corey Flat
Joins sheet 34, Chandler Spring
Joins sheet 41, Cherry Spring
Joins sheet 43, Pine View
108°07'30"
108°05'00"
108°02'30"
108°00'00"
46°22'30"
46°20'00"
46°17'30"
46°15'00"
R. 29 E.
R. 30 E.
T. 7 N.
T. 6 N.
Shovel Creek
Hawk Creek
Dry Fork
YELLOWSTONE COUNTY

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid
1000-meter ticks: Universal Transverse Mercator, zone 12.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

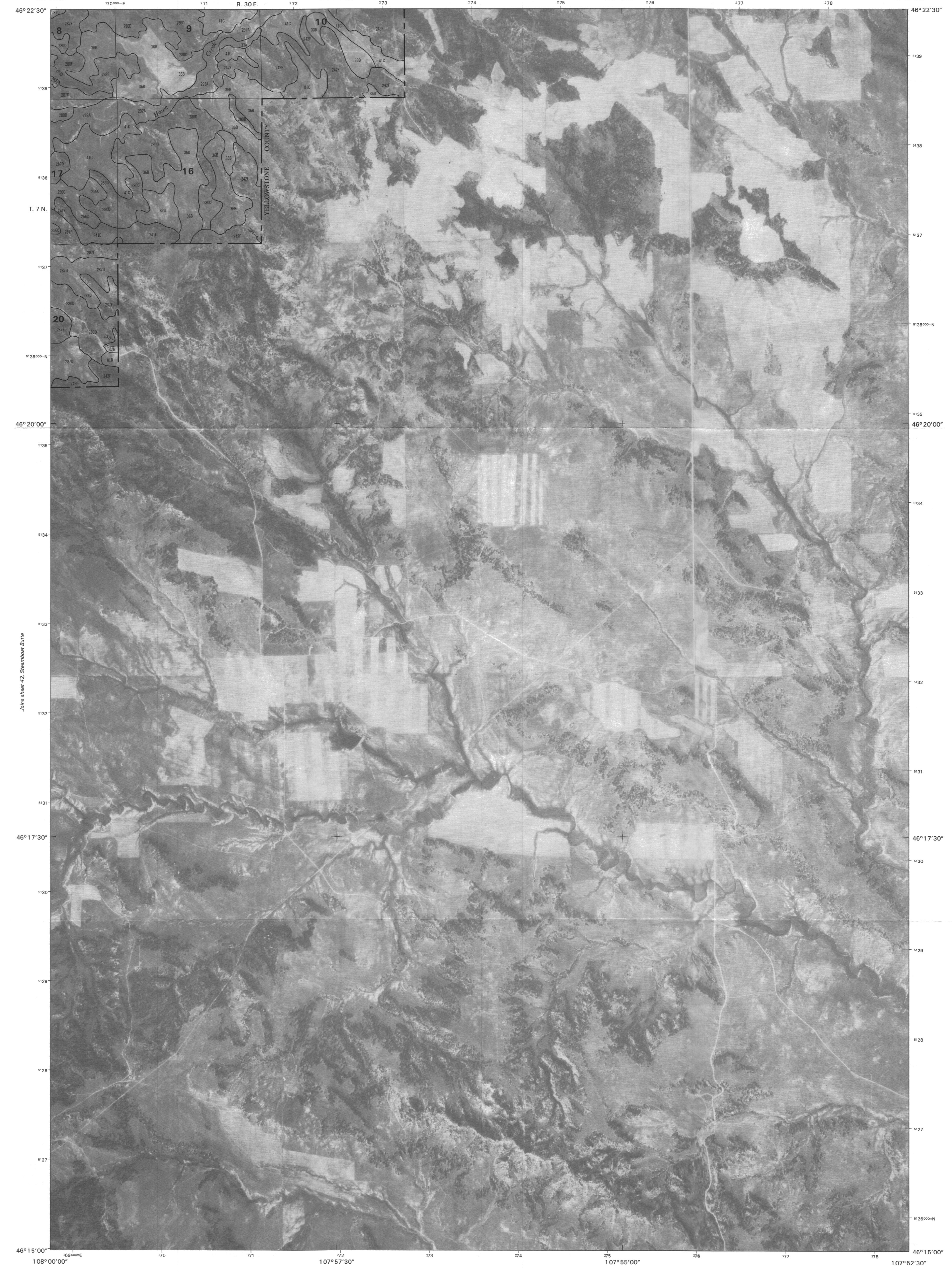

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

STEAMBOAT BUTTE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 42 OF 48

QUADRANGLE LOCATION

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

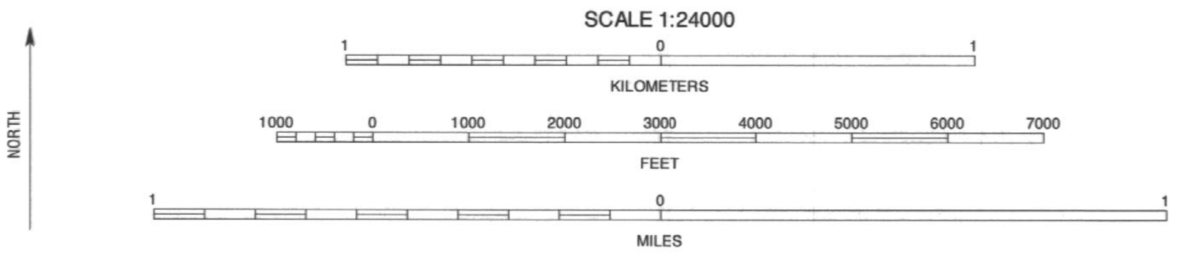
MUSSELSHELL COUNTY, MONTANA
PINE VIEW QUADRANGLE
SHEET NUMBER 43 OF 48



Joins sheet 33, Corey Flat
Joins sheet 34, Chandler Spring
Joins sheet 35, Weed Creek West
Joins sheet 42, Steamboat Butte
108°00'00"
107°57'30"
107°55'00"
107°52'30"
46°22'30"
46°20'00"
46°17'30"
46°15'00"
270000m E
271
272
273
274
275
276
277
278
269000m E
5139
5138
5137
5136000m N
5135
5134
5133
5132
5131
5130
5129
5128
5127
5126000m N
R. 30 E.
T. 7 N.
8
9
10
16
17
20
Hawk
Creek
YELLOWSTONE COUNTY
287D
287F
280D
36B
288F
41C
292A
33A
242F
33B
243F
81C
256C
241E
82B
286F

This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 13. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.



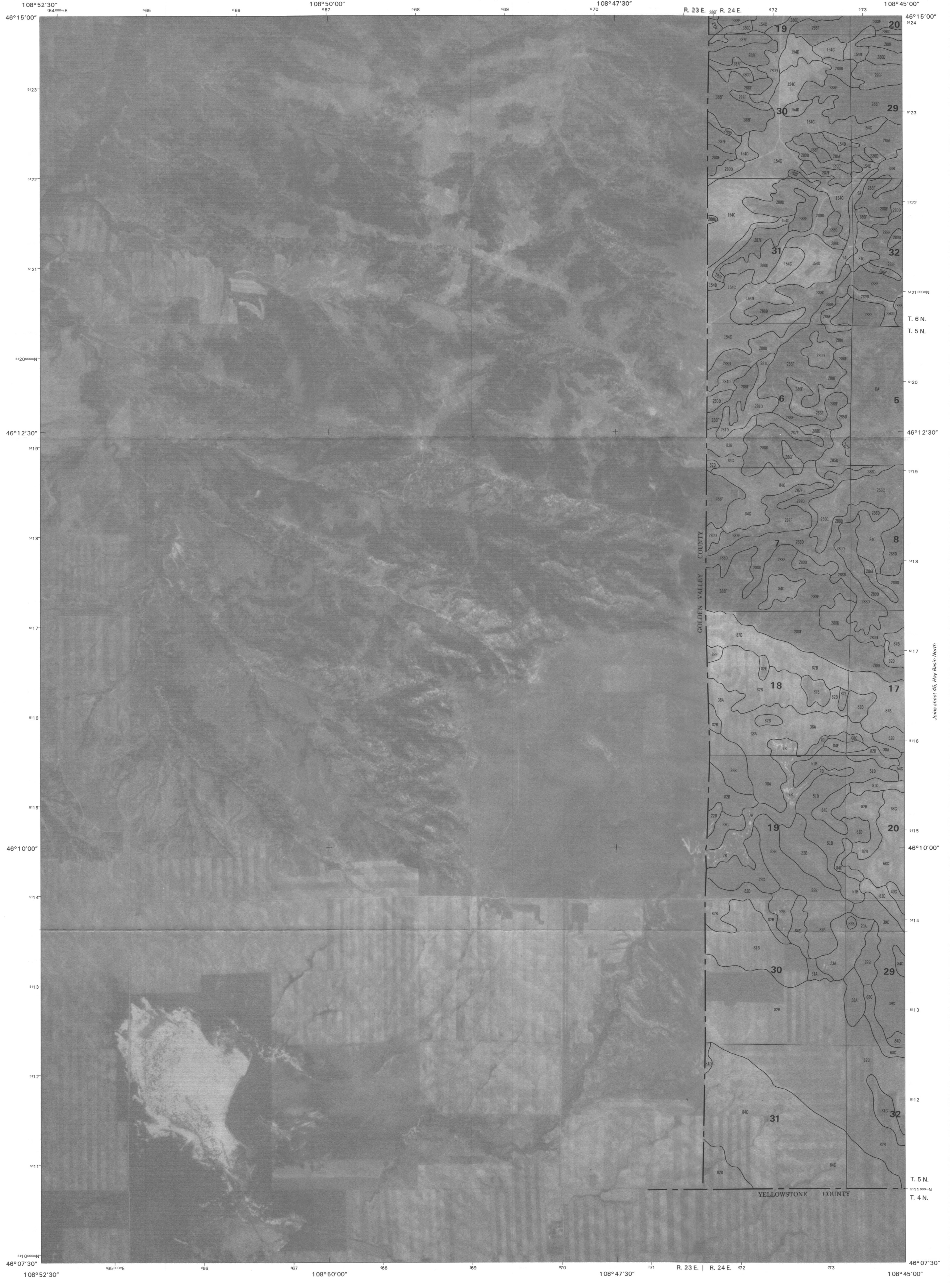
NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

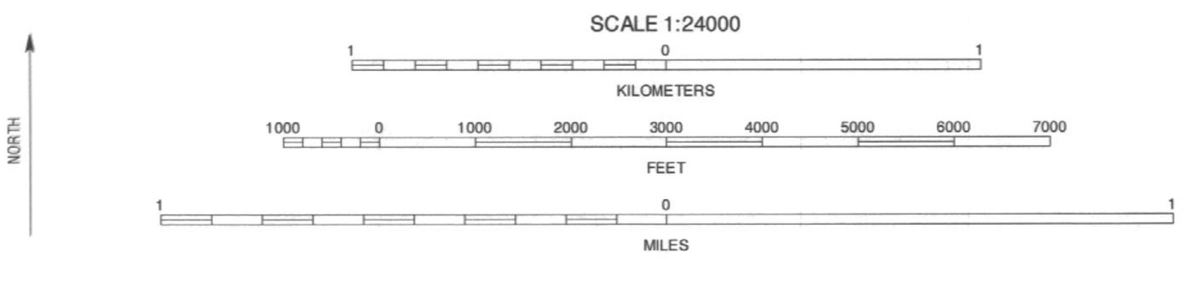
QUADRANGLE LOCATION

PINE VIEW, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 43 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
BROADVIEW NE QUADRANGLE
SHEET NUMBER 44 OF 48


Joins sheet 36, Bundy
Joins sheet 37, Elso
Joins sheet 45, Hay Basin North
108°52'30"
108°50'00"
108°47'30"
108°45'00"
46°15'00"
46°12'30"
46°10'00"
46°07'30"
664000m E
665
666
667
668
669
670
671
672
673
5124
5123
5122
5121
5121000m N
5120000m N
5120
5119
5118
5117
5116
5115
5114
5113
5112
5111
5111000m N
5110000m N
665000m E
R. 23 E.
R. 24 E.
T. 6 N.
T. 5 N.
T. 4 N.
GOLDEN VALLEY COUNTY
YELLOWSTONE COUNTY
19
20
30
29
31
32
6
5
7
8
18
17
19
20
30
29
31
32
154C
288F
288D
287F
284D
256C
84C
82B
82E
87B
38A
36B
7B
51B
27B
23C
22B
81B
84E
84D
23A
51A
68C
39C
6A
8A
33B
52B
81D
31C


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

QUADRANGLE LOCATION

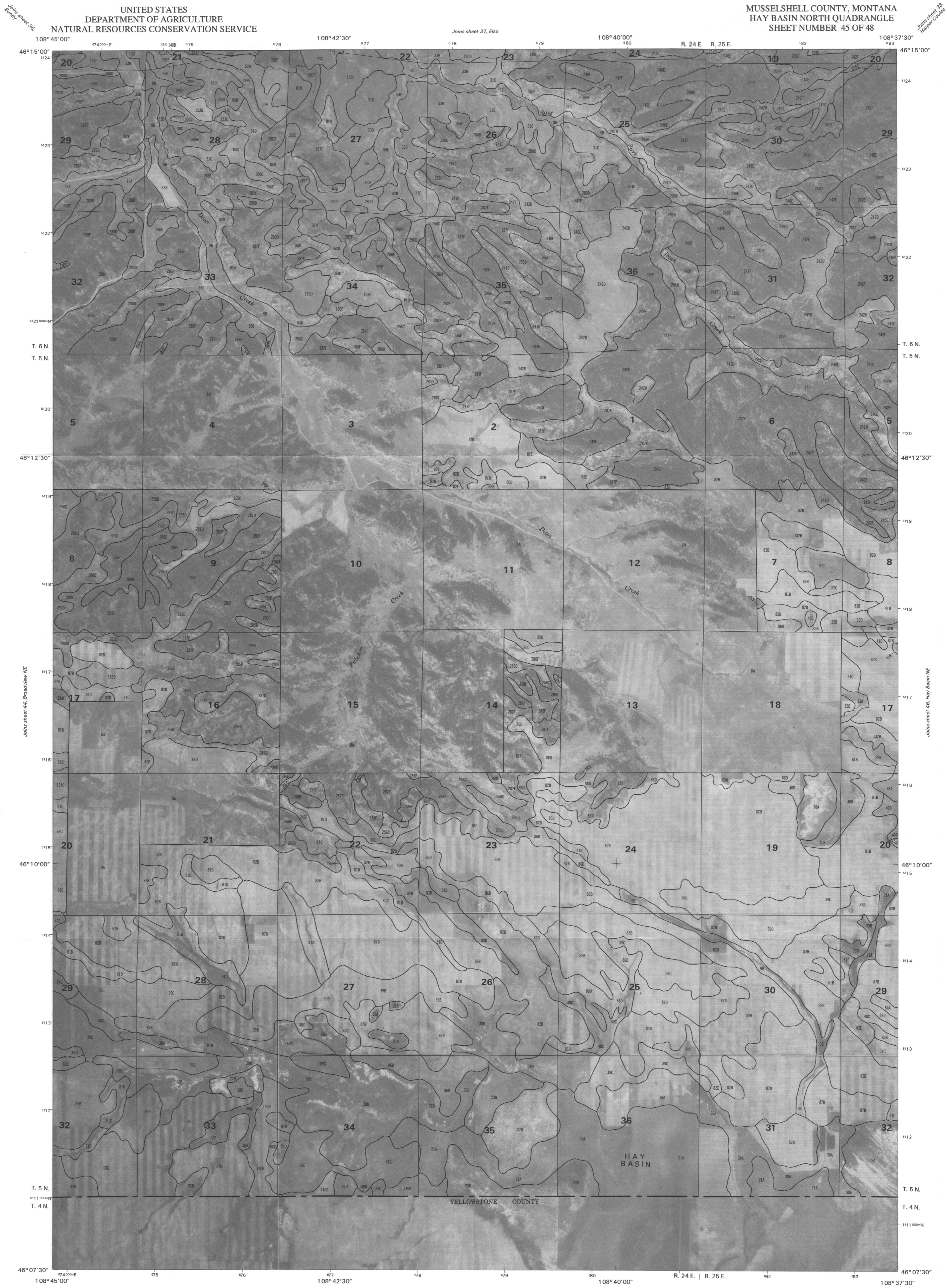
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service, formerly Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from (1975-1977) aerial photography. Hydrography and culture information were acquired from U.S. Geological Survey data; therefore, some features may not align exactly with base imagery.

North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

BROADVIEW NE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 44 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
HAY BASIN NORTH QUADRANGLE
SHEET NUMBER 45 OF 48


Joins sheet 36, Bundy
Joins sheet 37, Elso
Joins sheet 38, Harper Coulee
Joins sheet 44, Broadview NE
Joins sheet 46, Hay Basin North
108°45′00″
108°42′30″
108°40′00″
108°37′30″
46°15′00″
46°12′30″
46°10′00″
46°07′30″
R. 24 E.
R. 25 E.
T. 6 N.
T. 5 N.
T. 4 N.
East Fork
Dean Creek
Pitcher Creek
HAY BASIN
YELLOWSTONE COUNTY

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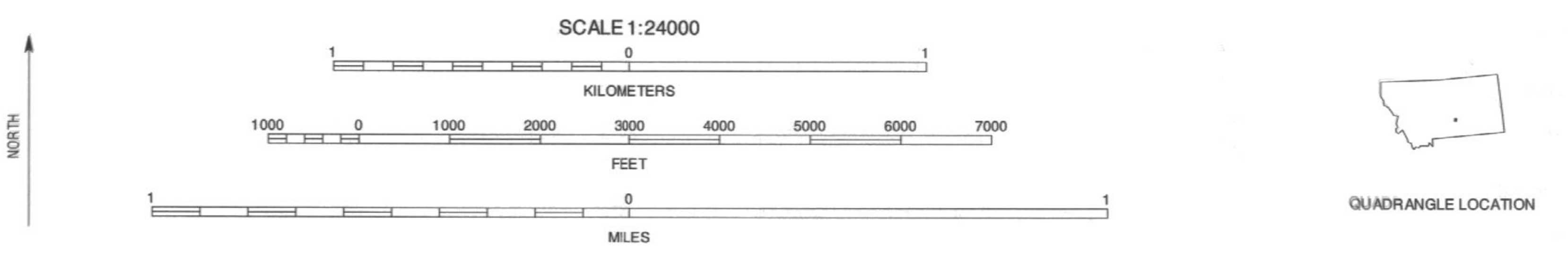
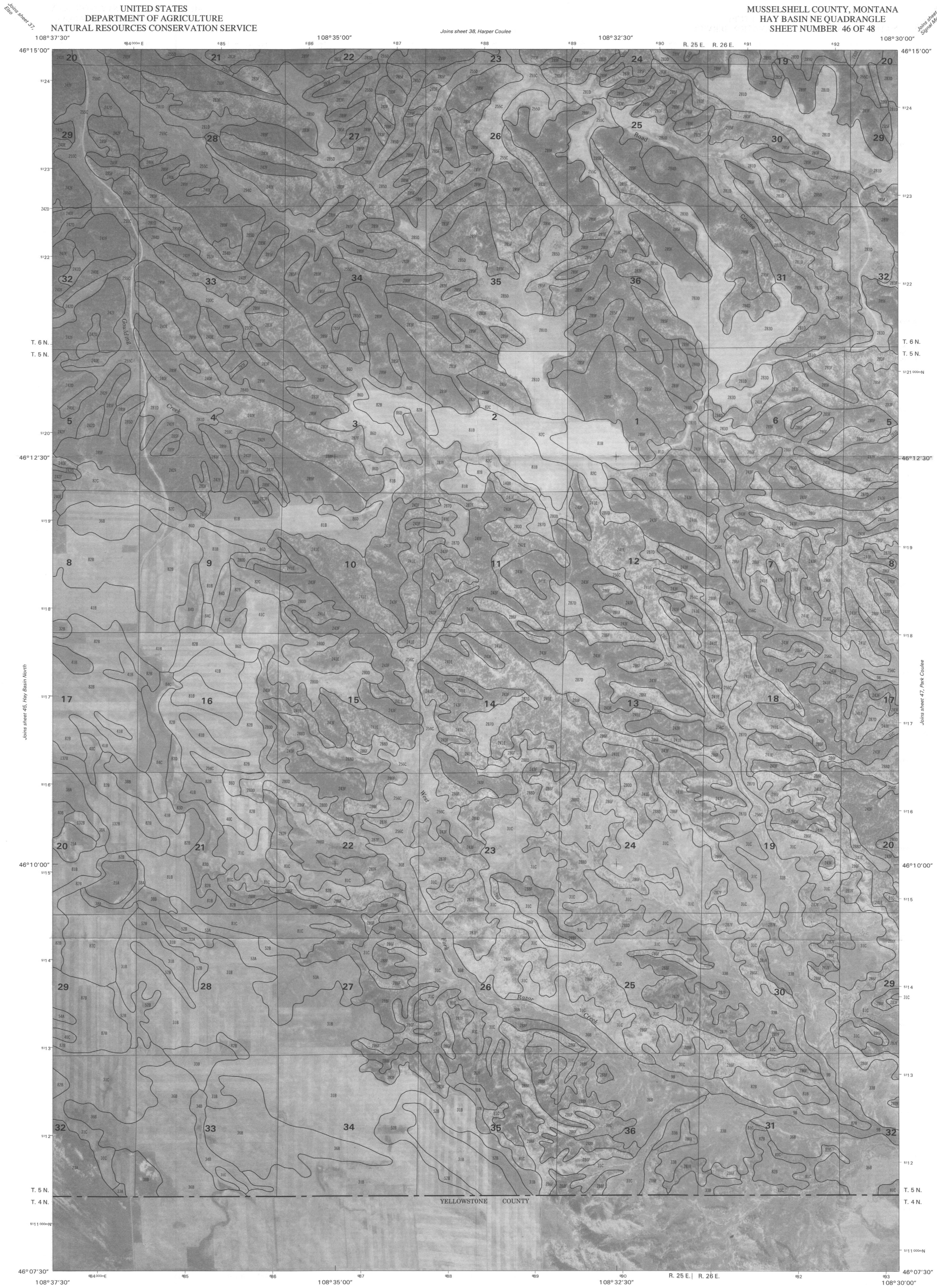
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES
QUADRANGLE LOCATION

HAY BASIN NORTH, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 45 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
HAY BASIN NE QUADRANGLE
SHEET NUMBER 46 OF 48


Joins sheet 37, Eiko
Joins sheet 38, Harper Coulee
Joins sheet 39, Signal Mountain
Joins sheet 45, Hay Basin North
Joins sheet 47, Park Coulee
108°37'30"
108°35'00"
108°32'30"
108°30'00"
46°15'00"
46°12'30"
46°10'00"
46°07'30"
R. 25 E.
R. 26 E.
T. 6 N.
T. 5 N.
T. 4 N.
Gouldink Creek
Road
Coulee
West Fork
Razor Creek
YELLOWSTONE COUNTY

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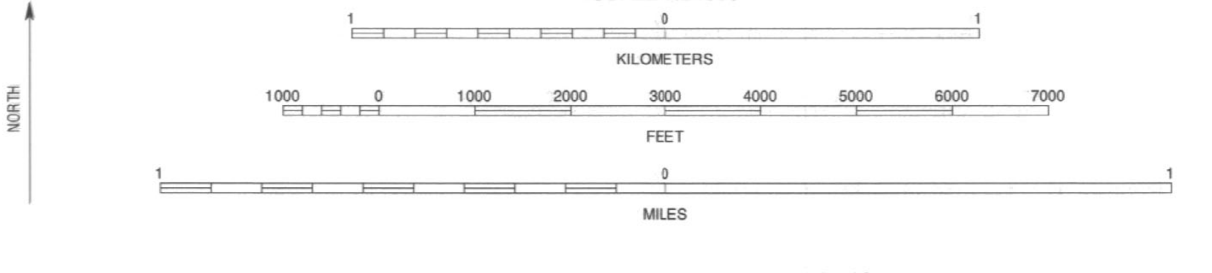

NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

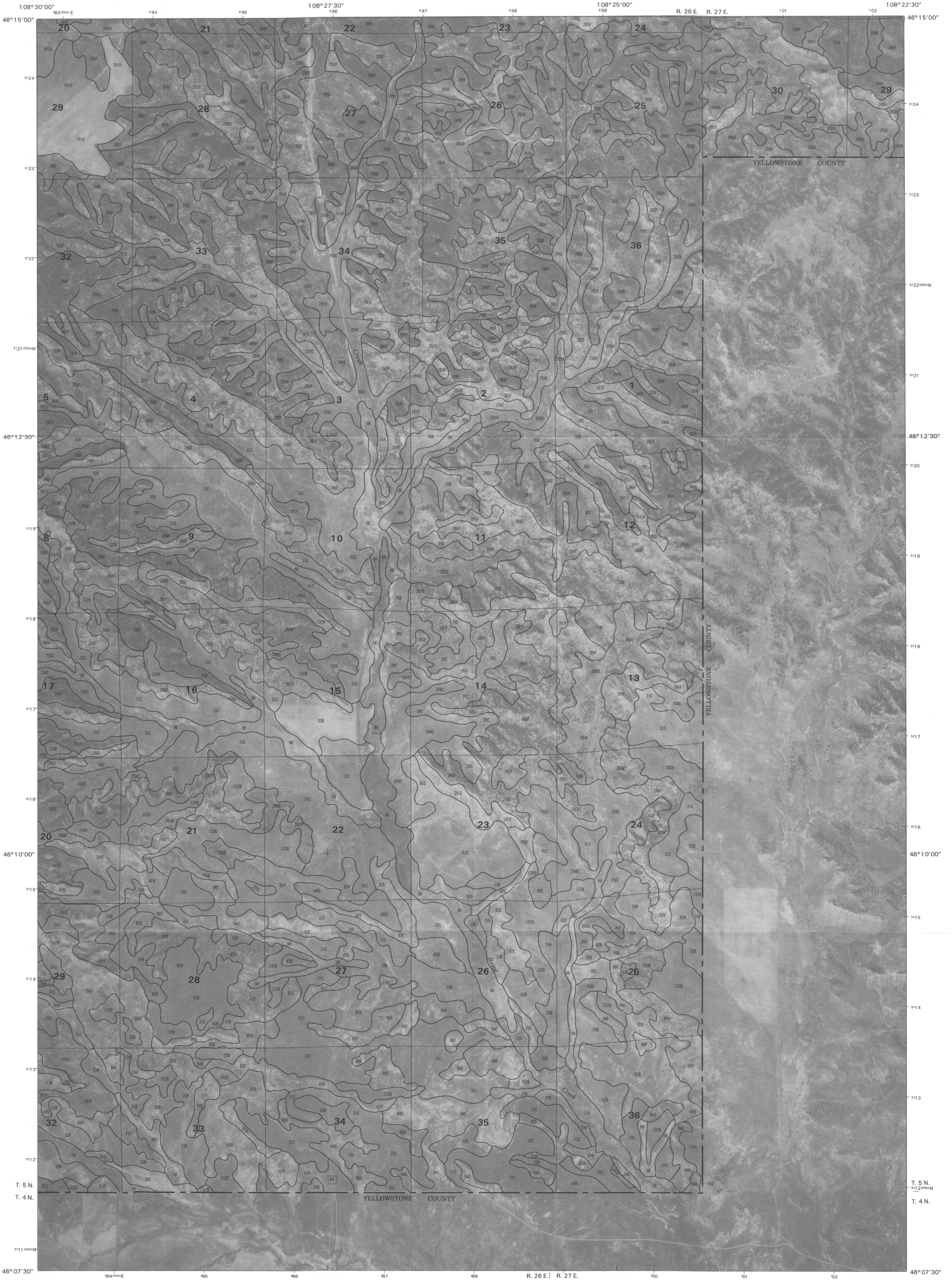
MUSSELSHELL COUNTY, MONTANA NO. 46

QUADRANGLE LOCATION

HAY BASIN NE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 46 OF 48

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
PARK COULEE QUADRANGLE


108°30'00"
46°15'00"
108°27'30"
108°25'00"
108°22'30"
46°12'30"
46°10'00"
46°07'30"
693000mE
694
695
696
697
698
699
701
702
694000mE
695
696
697
698
700
701
702
5124
5123
5122
5121000mN
5120
5119
5118
5117
5116
5115
5114
5113
5112
5112000mN
5111000mN
5122000mN
R. 26 E.
R. 27 E.
T. 5 N.
T. 4 N.
YELLOWSTONE COUNTY
Razor Creek
Creek
87
20
21
22
23
24
25
26
27
28
29
30
32
33
34
35
36
1
2
3
4
5
8
9
10
11
12
13
14
15
16
17

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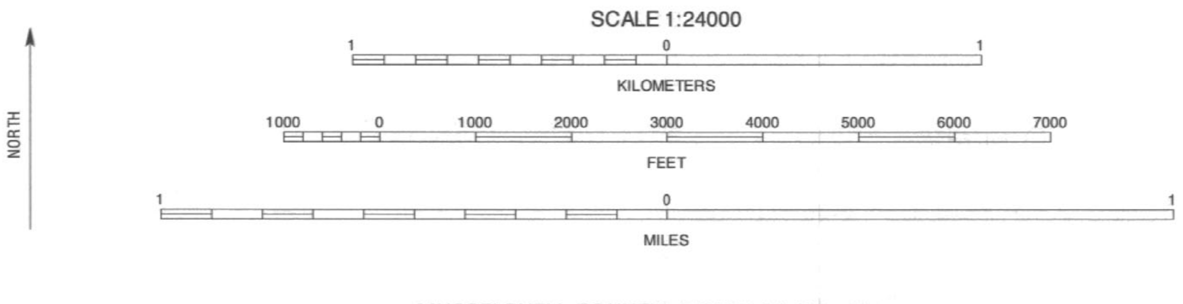
North American Datum of 1927 (NAD27). Clarke 1866 Spheroid 1000-meter ticks: Universal Transverse Mercator, zone 12. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.


NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

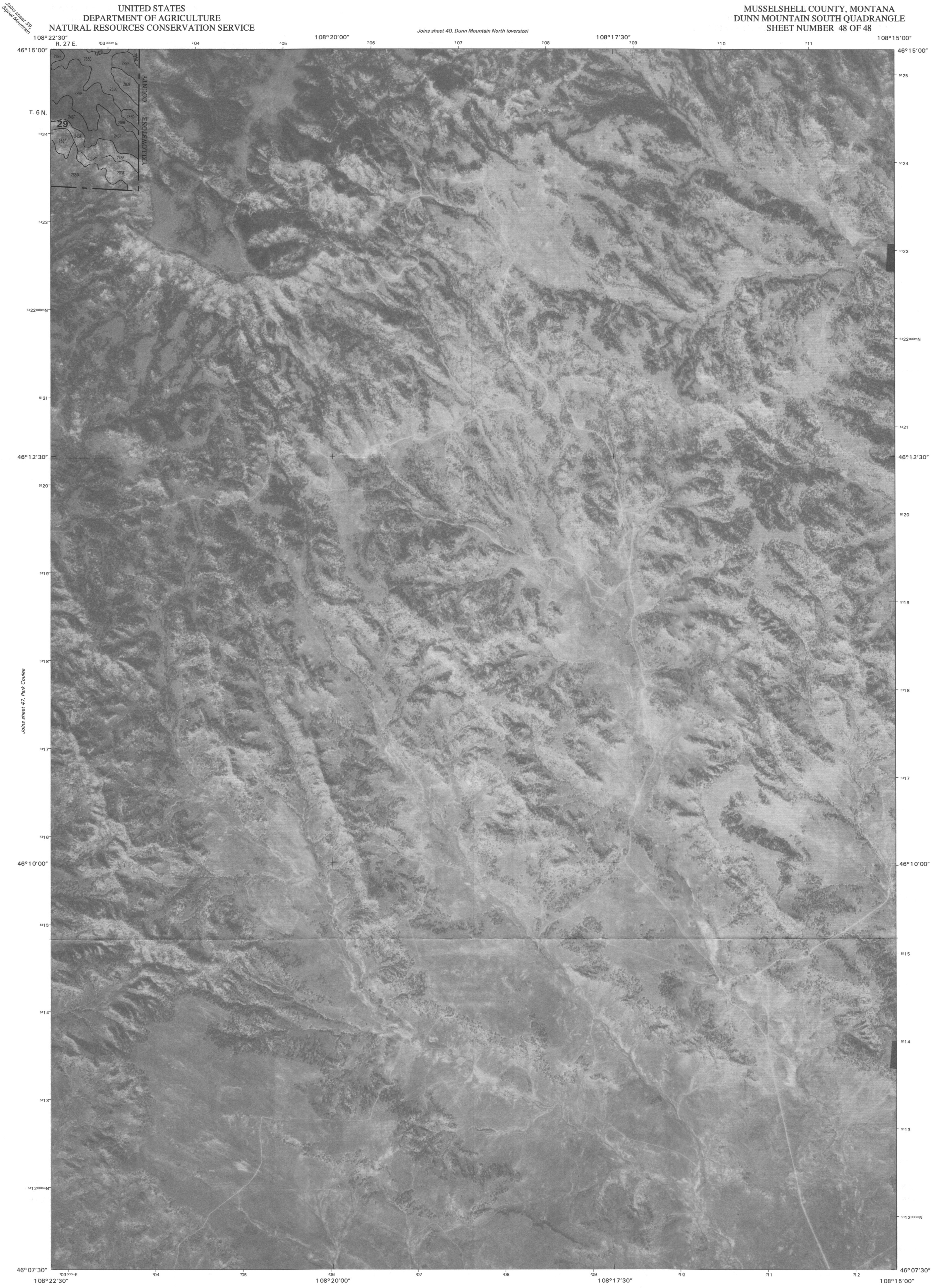
QUADRANGLE LOCATION

PARK COULEE, MONTANA
7.5 MINUTE SERIES
SHEET NUMBER 47 OF 48

MUSSELSHELL COUNTY, MONTANA NO. 47

UNITED STATES
DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

MUSSELSHELL COUNTY, MONTANA
DUNN MOUNTAIN SOUTH QUADRANGLE
SHEET NUMBER 48 OF 48


Joins sheet 39, Signal Mountain
Joins sheet 40, Dunn Mountain North (oversize)
Joins sheet 47, Park Coulee
108°22'30"
108°20'00"
108°17'30"
108°15'00"
46°15'00"
46°12'30"
46°10'00"
46°07'30"
R. 27 E.
T. 6 N.
703 000m E
704
705
706
707
708
709
710
711
712
5125
5124
5123
5122 000m N
5121
5120
5119
5118
5117
5116
5115
5114
5113
5112 000m N
YELLOWSTONE COUNTY
29
289F
255C
285D
283F
246F
245F

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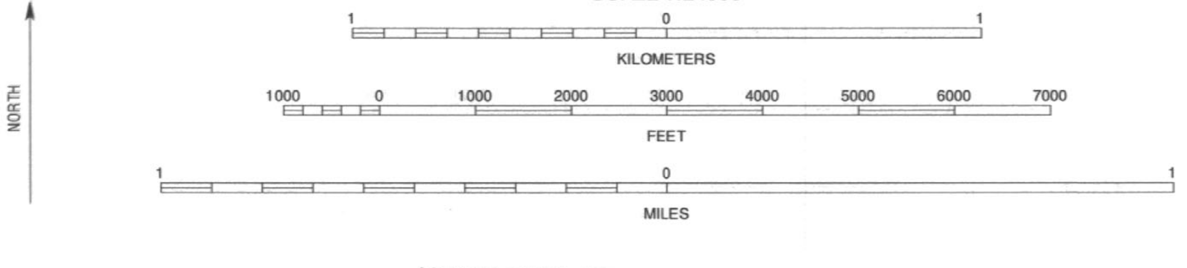
NORTH
SCALE 1:24000
1
0
1
KILOMETERS
1000
0
1000
2000
3000
4000
5000
6000
7000
FEET
1
0
1
MILES

MUSSELSHELL COUNTY, MONTANA NO. 48

DUNN MOUNTAIN SOUTH, MONTANA

7.5 MINUTE SERIES
SHEET NUMBER 48 OF 48

QUADRANGLE LOCATION